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P. C. TSOONG

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WITH SPECIAL REFERENCE TO THOSE FROM THE
EASTERN HIMALAYA

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P. C. TSOONG

(Academia Sinica, Peking)

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NEW HIMALAYAN SPECIES OF *PEDICULARIS* WITH SPECIAL REFERENCE TO THOSE FROM THE EASTERN HIMALAYA

By P. C. TSOONG

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THE principal collections dealt with in this paper are those made by F. Ludlow and G. Sherriff and their associates in the Eastern Himalaya and by O. Polunin in Nepal, which are deposited in the Department of Botany, British Museum (Natural History). The former are the more important, not simply because of their greater volume but chiefly from their provenance. As is shown by the map of the distribution of the genus *Pedicularis* in eastern Asia published by Hui-Lin Li in part 1 of his "Revision of the genus *Pedicularis* in China" (*Proc. Acad. Nat. Sci. Philad.* c: map 2 (1948)) there is a lack of distributional records between the Sikang-Yunnan region in the east and the Sikkim Himalaya further west. In this gap lie Bhutan and south-eastern Tibet, and it includes the area generally known as the Eastern Himalaya. Although visited by F. Kingdon-Ward, some of whose *Pedicularis* collections were enumerated by Marquand and Airy Shaw in *Journ. Linn. Soc. London, Bot.* xlviii: 210-214 (1929), this region had not hitherto been explored for botanical purposes. The Sikang-Yunnan and Sikkim regions boast the highest concentrations of *Pedicularis* species in the world. Hence it seemed probable that our meagre knowledge about the intervening region was not due to any natural deficiency in species there, but simply to lack of material. The gap was unlikely to constitute a natural poverty-stricken area in the distribution of the genus like the deserts of Mongolia. It was obvious that valuable and important collections were likely to come from this hitherto unexplored area in which Ludlow and Sherriff and their companions worked so thoroughly. The wealth of *Pedicularis* material obtained confirms the high expectation of what might be discovered in this region. It is sufficient to mention that the Bhutan-Tibet collections alone contain seventy-seven species; of these, twenty-five species are described below for the first time. This high percentage of endemism compares favourably with that of the adjoining areas. These new species in some instances help us better to understand species already known by indicating phyletic relations. Others exhibit morphological features not previously recorded.

Polunin's collection was made in Nepal, and *Pedicularis* material from that country was studied by Prain and enumerated in two papers (*Journ. As. Soc. Bengal*, lviii: 255-278 (1889); *Ann. R. Bot. Gard., Calcutta*, iii: 1-196 (1890)). Three new species from Nepal are described in this paper.

In addition to the above, five new species were found among miscellaneous collections gathered by F. Kingdon-Ward, Miss E. G. Benham, A. Petelot and A. F. G. Kerr.

I take this opportunity of acknowledging the kindness of the Keeper of Botany in putting at my disposal the rich material of the British Museum (Natural History).

To other members of the botanical staff I wish to express my indebtedness for the help freely given to me during my stay. Finally, my gratitude is due to Messrs. F. Ludlow and G. Sherriff, whom I was fortunate enough to meet in the Museum, for their information about various localities represented in their collections, without which much more work would necessarily have been involved.

In this paper the arrangement of the species follows a classification of the genus which, it is hoped, will shortly be published.

The classification of infraspecific taxa adopted here is based on the current opinion that the vegetative characters within this genus are less liable to change than floral characters. Consequently, all variations pertaining to vegetative organs are kept under the rank of *subspecies*, those pertaining to the corolla under that of *variety*, and those pertaining to the colour of flowers under that of *forma*. In such a way it is possible to arrange the various ranks at will, without overlapping each other, to suit the actual conditions prevailing.

PEDICULARIS OEDERI Vahl in Hornem., *Oekon. Plantel.* ed. 2 : 580 (1806).

This is one of the most variable species in the genus *Pedicularis*. The variations are by no means limited to the vegetative organs alone, but happen alike in the structure and colouring of the flowers. Apparently the variations occur quite at random ; the long-hooded form of flower may be found associated with both typical foliage and with foliage having a gill-like arrangement. Likewise, the red colouring may arise in forms with typical short-hooded flowers and in forms with long-hooded flowers.

Subsp. **branchiophylla** (Pennell) Tsoong, comb. nov.

P. branchiophylla Pennell, *Scroph. W. Himal* : 142, t. 25a (1943).

The gill-like arrangement of pinnae is by no means limited to the eastern Himalayan form described by Pennell from Sikkim as a new species, but is shared by specimens from China and elsewhere. These do not warrant specific rank on that account.

PEDICULARIS CRYPTANTHA Marquand & Shaw in *Journ. Linn. Soc. London, Bot.* xlviii : 211 (1929).

In the following subspecies of *P. cryptantha* the habit is erect rather than diffuse. It is found in pine forest, while the type (subsp. *cryptantha*) usually inhabits more open situations.

Subsp. **erecta** Tsoong, subsp. nov.

A typo habitu compacto erecto vix 7 cm. alto, foliis minoribus (petiolo incluso 4.5 mm. tantum longis), calyce densius piloso satis distincta.

S.E. TIBET: Deyang La, Kongbo, 3,048 m., growing in pine forest ; perianth yellow ; 25th May, 1947, *Ludlow, Sherriff & Elliot 15060* (holotype in Herb. Brit. Mus.).

***Pedicularis filiculiformis* Tsoong, sp. nov. (Ser. *Filiculae*).**

Herba perennis. *Radiculae* plurimae subcylindricae pinguae. *Caules* singuli vel perpauci, basi squamis siccis lanceolatis dense obtecti, 12 cm. alti, glabri. *Folia* radicalia longe petiolata, petiolis ad 4 cm. longis, lamina oblonga, 15–30 mm. longa, 5–11 mm. lata, pinnatisecta, segmentis 6–13-jugis oblongis iterum lobulato-dentatis, supra glabra subtus albido-furfuracea. *Inflorescentia* manifeste centrifuga, floribus racemosis. *Calyx* 8 mm. longus, leviter fissus, dentibus ut in *P. filicula* Franch. *Corollae* tubus 15 mm. longus; galeae pars verticalis 3 mm. longa, pars antherigera 5 mm. longa, 2.5 mm. lata, sensim in rostrum 4.5 mm. longum apice denticulatum abiens; labium inferum 10 mm. longum ac latum, lobo medio rotundato, vix minora quam lateralibus, omnibus margine ciliatis. *Filamenta* antica pilosa.

Var. *filiculiformis*.

S.E. TIBET: Taktsang, Tsari, 4,420 m., on open damp stony hillside; corolla wine red, white at the throat; 22 June, 1936, *Ludlow & Sherriff* 2197 (holotype in Herb. Brit. Mus.).

This species is rather close to *P. filicula* Franch., from which it differs in having a branched fleshy rhizome similar to that of *P. rupicola* Franch., and not fasciculate and spindle-shaped as in *P. filicula*. The flower differs also in its longer tube and beak, the latter pointing forward instead of definitely downwards. The segments of the leaves are also less numerous. *P. wallichii* Bunge, which is somewhat akin, has a much longer vertical portion of galea and a fewer flowered inflorescence, which gives it a very different general appearance.

Var. *dolichorrhyncha* Tsoong, var. nov.

A var. *filiculiforme* galeae rostro satis longiore recedit.

BHUTAN: Me La, 4,420 m., on overgrown boulders; flowers purple, faintly scented; 20th June, 1949, *Ludlow, Sherriff & Hicks* 20380 (holotype in Herb. Brit. Mus.).

The habit and floral characters differ little from those of the specific type, except for the beak being much longer and more slender at the tip, in which character it approaches *P. takpoensis* Tsoong. That species can, however, easily be recognized by the absence of broad basal scales, the generally much lower habit and the less densely hairy anterior filaments.

***Pedicularis takpoensis* Tsoong, sp. nov. (Ser. *Filiculae*)**

Herba perennis, humilis, ad 9 cm. alta. *Radix* elongata, carnosa. *Caules* saepe plurimi, basi petiolis vetustioribus filiformibus dense vestiti. *Folia* radicalia longe petiolata, petiolis ultra 3 cm. longis, glabris; lamina lanceolato-oblonga, 7–15 mm. longa, 3–5 mm. lata, pinnatipartita, segmentis 7–8-jugis crenato-dentatis margine magis revolutis, supra glabra subtus albo-furfuracea; caulina minora 3–5-jugatim pinnatipartita. *Inflorescentia* centrifuga, floribus circ. 7–8 racemosis. *Calyx* leviter fissus, tubo 5 mm. longo glabro, dentibus inaequalibus 2.5 mm. longis stipitatis

apice inflatis dentatis denticulis valde reflexis. *Corollae* tubus 16 mm. longus, glaber ; galeae pars verticalis 5 mm. longa, pars antherigera in angulo recto inflexa, 4 mm. longa, 2.5 mm. lata, gradatim in rostrum tenue 5 mm. longum apice leviter dilatatum attenuata ; labium inferum 10 mm. longum, 12 mm. latum. *Filamenta* antica leviter pilosa.

S.E. TIBET : Chiniung La, Langong, Takpo, 4,260 m., on rocky open slope ; perianth wine red, tip of galea a little darker, throat white ; stem crimson ; 20th June, 1938, *Ludlow, Sherriff & Taylor 5614* (holotype in Herb. Brit. Mus.).

Although closely allied to *P. filiculiformis* Tsoong this species has no broad basal scales, but is furnished instead with slender persistent petioles. The beak is also much longer.

PEDICULARIS NEPALENSIS Prain in *Journ. As. Soc. Bengal* lviii, 2 : 268 (1889).

Forma **alba** Tsoong, forma nov.

A typo recedit floribus albis haud coloratis.

BHUTAN : Rinchen Chu, Takse La, 4,725 m. ; in scree ; calyx pale green, tips darker green ; corolla snow white ; 18th August, 1949, *Ludlow, Sherriff & Hicks 17160* (holotype in Herb. Brit. Mus.).

PEDICULARIS PRZEWALSKII Maxim. in *Bull. Acad. Imp. Sci. St. Pétersb.* xxiv : 55 (1878).

Subsp. **australis** (Li) Tsoong, comb. nov.

P. przewalskii : var. *australis* Li in *Proc. Acad. Nat. Sci. Philad.* ci : 113 (1949)

S.E. TIBET : Hills north of Lhasa, 3,960–4,260 m. ; 25th June, 1943, *Ludlow & Sherriff 9707*. Hills south of Lhasa, on the Sha La, 4,260 m. ; 11th July, 1943, *Ludlow & Sherriff 9763*. Reting, 60 miles north of Lhasa, 4,725 m. ; 24th July, 1942, *Ludlow & Sherriff 8873*.

Pedicularis bella Hook. f., *Fl. Brit. Ind.* iv : 313 (1884).

P. bella is a highly variable species.

Subsp. **BELLA**

P. bella var. *typica* Li in *Proc. Acad. Nat. Sci. Philad.* ci : 110 (1949).

Subsp. **holophylla** (Marq. & Shaw) Tsoong, comb. nov.

P. bella var. *holophylla* Marquand & Shaw in *Journ. Linn. Soc. London, Bot.* xlviii : 211 (1929).

Subsp. **holophylla** var. **crestifrons** Tsoong, var. nov.

A typo subspeciei *holophyllae* differt tantum galea ad finum partis antherigerae crista prominenti 1.5 mm. lata abrupte munita.

S.E. TIBET : Doshong La, Kongbo, 4,115 m. ; on cliff faces ; calyx green, corolla snow white, spur purple, tube very pale yellow ; 18th August, 1947, *Ludlow, Sherriff & Elliot 14403* (holotype in Herb. Brit. Mus.).

An interesting plant which, in the shape of the leaves, agrees perfectly with Marquand and Shaw's var. *holophylla*, but has a prominently crested galea.

PEDICULARIS LONGIFLORA Rudolph in *Mém. Acad. Imp. Sci. St.-Petersb.* iv : 345, t. 2 (1811).

Var. **tubiformis** (Klotzsch) Tsoong, comb. nov.

P. tubiformis Klotzsch in Klotzsch & Garcke, Bot. Ergebn. Reise Prinz Waldemar : 106, t. 57 (1862).

P. longiflora subsp. *tubiformis* (Klotzsch) Pennell, Scroph. W. Himal : 150 (1943).

PUNJAB : Chitkal, Baspa Valley, Simla Hill States, 3,810 m. ; 17th July, 1939, *Sherriff* 7436.

KASHMIR : Shushal, Ladak, 4,350 m. ; 1st August, 1931, *Ludlow* 833. Leh Ladak, 3,505 m. ; 8th July, 1941, *Ludlow & Sherriff* 8475. Khardong La, 4,572 m. ; 19th August, 1928, *Ludlow* 492.

NEPAL : Brangechen Kharka, 4,570 m. ; 11th June, 1949, *O. Polunin* 295.

BHUTAN : Laya, Upper Mo Chu, 3,658 m. ; 4th August, 1949, *Ludlow, Sherriff & Hicks* 16449. Kantanang, Tsampa, 3,810 m. ; 11th July, 1949, *Ludlow, Sherriff & Hicks* 19110. Me La (south side), 3,960 m. ; 22nd August, 1949, *Ludlow, Sherriff & Hicks* 21066. Cho La, 3,650 m. ; 21st August, 1949, *Ludlow, Sherriff & Hicks* 21413.

S.E. TIBET : Yatung, Amo Chu Valley, 3,200 m. ; 10th October, 1942, *Ludlow & Sherriff* 10035.

PEDICULARIS SIPHONANTHA D. Don, *Prodr. Fl. Nepal.* : 95 (1825).

Subsp. **prostrata** (Bonati) Tsoong, comb. nov.

P. siphonantha var. *prostrata* Bonati in Rec. Bot. Survey Ind. iv : 400 (1913).

BHUTAN : Lao La, Ritang, 3,505 m. ; 2nd June, 1937, *Ludlow & Sherriff* 3172.

PEDICULARIS MEGALOCHILA Li in *Taiwania*, i : pl. 1, fig. 7, 91 (1948).

The type of this species was collected in 1931 by F. Kingdon-Ward in the Adung Valley, Burma and seems to have had yellow flowers. According to the field notes of later collectors, the colour seems to be extremely variable and ranges from pink with whitish margin (*Ludlow & Sherriff* 2229) to deep reddish purple (*Ludlow & Sherriff* 1921). *P. megalochila* is easily confused with three other similar species, i.e. the red-coloured form being mistaken for *P. rhinanthoides* Schrenk and its several varieties, and also for *P. megalantha* D. Don ; the yellow-flowered form for *P. hoffmeisteri* Klotzsch. From the first, however, it can be easily distinguished by its galea which leans back rather than bends slightly forward as in that species. From the two other species (to which it is more closely related than the first), it may be recognized by its perennial, non-branching habit and its branching roots. The absence of well developed cauline leaves and the much smaller capsules also help to separate it from these species. Another form with the same yellow flower, but slightly longer tube and narrow ligulate mid-lobe of the lower lip, looks sufficiently distinct

to be a new species, but as some specimens are intermediate between it and the typical form, it is described below as a variety.

Var. **ligulata** Tsoong, var. nov.

Tubus corollae quam in typo longior; labium inferum angustum lobo medio liguliformi.

S.E. TIBET: Singo Samba, Lo La Chu near Molo, Kongbo, 3,810 m.; open dry hillsides; flower yellow, spur dark purple; 28th June, 1936, *Ludlow & Sherriff 1874* (holotype in Herb. Brit. Mus.). Tsari Sama, Langong, Takpo, 3,960–4,115 m.; 16th June, 1938, *Ludlow, Sherriff & Taylor 5574*.

Forma **rhodantha** Tsoong, forma nov.

Flores dilute rosei usque ad atropurpurei, quoad gradum coloris variabiles sed structura cum typo speciei congruentes.

BHUTAN: Rinchen Chu, La Chu La, 4,725 m.; 17th August, 1949, *Ludlow, Sherriff & Hicks 17137*. Narim Thang, 3,960 m.; 23rd July, 1949, *Ludlow, Sherriff & Hicks 21323*. Shingbe (Me La), 4,115 m.; 23rd August, 1949, *Ludlow, Sherriff & Hicks 21088*. Me La, 4,260 m.; 6th August, 1933, *Ludlow & Sherriff 425*. Me La, Cho La Valley, 3,960 m.; 2nd July, 1949, *Ludlow, Sherriff & Hicks 20456a*.

S.E. TIBET: Truka La, Mago, 4,420 m.; 5th August, 1934, *Ludlow & Sherriff 819*. Sur La, Tsari, 4,572 m.; 28th July, 1936, *Ludlow & Sherriff 1954*. West Tsari, Takar La, 4,260 m.; 27th June, 1936, *Ludlow & Sherriff 2229*. Chikchar, Tsari, 4,260–4,572 m.; 23rd August, 1936, *Ludlow & Sherriff 2476*. Pa La, near Kyimdong Dzong, Kongbo, 4,115 m.; 18th July, 1936, *Ludlow & Sherriff 1921*. Chiniung La, Langong, Takpo, 4,572 m.; 20th June, 1938, *Ludlow, Sherriff & Taylor 5607*.

Pedicularis longipedicellata Tsoong, sp. nov. (Ser. *Asplenifoliae*)

Herba perennis, acaulis, vix ultra 10 cm. alta, basi petiolis pedicellisque vetustioribus siccis dense vestita. *Radices* elongati subfusiformes. *Folia* omnia radicalia, longe petiolata, petiolis usque ad 30 mm. longis, alatis, glabris; lamina alte pinnatifida usque pinnatisecta, ambitu lineari-lanceolata, circa 20 mm. longa, 7 mm. lata, fere glabra, segmentis ovato-oblongis usque oblongo-linearibus, plus minus distantibus. *Flores* singulares, pedicellis radicalibus glabris, 16–65 mm. longis. *Calyx* cylindricus, 13 mm. longus, tubo 7 mm. longo, fere glabro, dentibus subaequalibus basi stipitatis apice satis accrescentibus foliaceis, grosse paucidentatis, margine reflexis. *Corollae* tubus 20–24 mm. longus, externe secus venas laterales pubescens; galeae pars verticalis circa 8 mm. longa, pars antherigera 6 mm. longa, 4.5 mm. lata, apice in rostrum breve 3 mm. longum fere abrupte attenuata; labium inferum 15 mm. longum, 19 mm. latum, trilobatum, lobo medio rotundato integro lateralibus ellipticis paulo minore, omnibus margine ciliatis. *Filamenta* antica leviter pilosa, fere glabra.

BHUTAN: Kantanang, Tsampa, 4,260 m.; in moss on rocks and beside dwarf *Rhododendron*; perianth wine red, pale in throat and helmet darker; 10th June, 1949, *Ludlow, Sherriff & Hicks 19093*; (holotype in Herb. Brit. Mus.). Saga La,

Upper Mangde Chu, 4,725 m. ; 14th July, 1949, *Ludlow, Sherriff & Hicks 16835*.
Marlung, Tsampa, 4,725 m. ; 11th July, 1949, *Ludlow, Sherriff & Hicks 19406a*.

This species comes very near *P. wallichii* Bunge in the general structure of the flowers. They agree in having an elongate vertical part of the galea, a thick anther-bearing part, and a short stout beak. The new species can, however, be easily distinguished by the more or less spindle-shaped rootlets and the lack of a stem which is supplanted in function partly by the elongated pedicels that reach sometimes a length of 6.5 cm. It also shows affinity to the European *P. portenschlagii* Sauter and *P. asplenifolia* Floerke, but both these species are definitely caulescent and differ in floral structure.

***Pedicularis rhizomatosa* Tsoong, sp. nov. (Ser. *Asplenifoliae*)**

Herba perennis, humilis, vix 7 cm. alta. *Rhizoma* elongatum, tenue, ad nodos squamis siccis ovatis vel lanceolatis ornatum ; caules singuli vel pauci, basi squamis ovatis dense obtecti. *Folia* longe petiolata, omnia radicalia, petiolis quam lamina 2-3-plolongioribus, ad 3 cm. longis, membranaceo-alatis ; lamina oblonga, 6-11 mm. longa, 3-5 mm. lata, profunde pinnatipartita fere pinnatisecta, rhachide alata, segmentis 3-4 jugis ovato-oblongis, herbaceis, lobulato-dentatis margine magis reflexis glabris. *Scapus* nudus, 5 cm. altus, superne longe pilosus ; *inflorescentia* subumbellata floribus congestis terminatus, bracteis tripartitis iis, *P. albiflorae* Prain et *P. meyanae* Hand.-Mazz. similibus, longe et sparse ciliatis. *Calyx* 5-dentatus, parvus, tubo 4 mm. longo, dentibus valde inaequalibus 2-3 mm. longis, omnibus stipitatis, apice plus minus dilatatis et subtrilobatis. *Corollae* tubus 10 mm. longus, glaber ; galeae pars verticalis 3 mm. longa, pars antherigera 4 mm. longum, 2 mm. latum, fere abrupte in rostrum longum tenue 5 mm. longum porrectum producta ; labium inferum leviter ciliatum, ambitu deltoideum, basi truncatum, apicem versus attenuatum, lobo medio parvo vix dimidium loborum lateralium ad medium leviter retusorum aequante. *Filamenta* antica sparse pilosa.

S.E. TIBET : Tamnyen La, Kongbo, 3,652 m. ; on avalanche slope ; corolla deep magenta, galea bent at right angles, purplish black ; 22nd June, 1938, *Ludlow, Sherriff & Taylor 4944* (holotype in Herb. Brit. Mus.).

A species allied to *P. meyana* Hand.-Mazz., *P. umbelliformis* Li and *P. tsarungensis* Li, but differing from these in the absence of the densely matted persistent petioles of the previous year's growth. The chief difference lies, however, in the long rhizome which is single and horizontal, and, like the base of the stem, is furnished with lanceolate scarious scales.

***Pedicularis perpusilla* Tsoong, sp. nov.**

Herba nana, vix 5 cm. alta. *Radiculae* paucae, plerumque binis, fusiformes, 5-10 mm. longae, apice attenuatae et fibrosae. *Caules* valde abbreviati, ad 15 mm. longi, bifariam pubescentes, basi squamigeri. *Folia* radicalia longe petiolata, petiolis 6-13 mm. longis, inferne plus minus dilatatis, membranaceis ; lamina ad 12 mm. longa, vix 5 mm. lata, pinnatisecta, segmentis distantibus, circ. 7-jugis, ovato-oblongis margine vulgo valde revolutis ambitu igitur quasi oblongo-linearibus.

Flores pauci (1-3), pedicellis ad 5 mm. longis, glanduloso-pubescentibus. *Calycis* tubus 6 mm. longus, antice ad $\frac{2}{3}$ fissus, fere glaber, dentibus 3, postico magis reducto, lateralibus postico duplo saltem majoribus apice leviter dilatatis lanceolatis. *Corollae* tubus 18 mm. longus, externe subdense pilosus; galeae pars verticalis 3 mm. longa, pars antherigera 6 mm. longa, apice in rostrum breve circa 4 mm. longum sensim attenuata; labium inferium amplum, margine ciliatum, trilobatum, lobo medio transverse elliptico, apice retuso, 4 mm. longo, 5.5 mm. lato, iis lateralibus medio plus quam duplo majoribus, ellipticis, 10 mm. longis, 6 mm. latis. *Filamenta* antica apice dense pubescentia.

BHUTAN: Pung La, 3,652 m.; peaty soil on rocks; flowers crimson marked with white; 9th July, 1949, Ludlow, Sherriff & Hicks 20906 (holotype in Herb. Brit. Mus.).

This species seems to be most closely related to *P. taylorii* Tsoong, but differs in having spindle-shaped instead of fibrous rootlets, a much shorter tube, but stronger galea. This, together with *P. taylorii*, *P. hicksii* Tsoong, *P. pseudoregeliana* Tsoong and *P. tapaoensis* Tsoong, a species described from Kanting (Tatsienlu) in Dr. H. Smith's collection (*Smith no. 11460*), forms a new series characterized by often dwarf habit and few, usually pedicellate flowers with a tube attaining a great length. The species of this series bear a close relationship to those of series *Asplenifoliae*, which consists of *P. asplenifolia* Floerke, *P. meyana* Hand.-Mazz., *P. umbelliformis* Li, etc., but differ from them in the much longer tube which is almost on para with those of series *Longiflorae*.

***Pedicularis hicksii* Tsoong, sp. nov.**

Herba perennis, nana, vix 6 cm. alta. *Radices* multae caespitosae fibriferae ad 6 cm. longae. *Caules* brevissimi vel subnulli. *Folia* omnia radicalia, petiolis ad 17 mm. longis, glabris; lamina lanceolata usque oblonga, 10-15 mm. longa, 3-5.5 mm. lata, ad medium pinnatifida, segmentis 4-5-jugis, triangulari-ovatis, iterum serratis, utrinque laxissime pubescentia. *Flores* ad 15 mm. longe pedicellati. *Calyx* membranaceus, 5-costatus, antice leviter fissus, tubo 7 mm. longo, dentibus 5, postico paulo monore, omnibus stipitatis apice flabelliformibus, inciso-dentatis. *Corollae* tubus circa 16 mm. longus, galeae pars verticalis 4 mm. longa, pars antherigera inflexa, 6 mm. longa, 3.5 mm. lata, in rostrum 3 mm. longum apice erosum attenuata; labium inferum 9 mm. longum, 13 mm. latum, ad medium in lobos tres subaequales fissum, lobo medio rotundato apice retuso; *Filamenta* antica breviter pubescentia.

BHUTAN: Shingbe (Me La), 4,420 m.; scree; flower crimson; 24th August, 1949, Ludlow, Sherriff & Hicks 21099 (holotype in Herb. Brit. Mus.).

A species distinct within the series by its long fibrous roots and relatively shallowly lobed leaves.

***Pedicularis taylorii* Tsoong, sp. nov.**

Herba annua (?), caespitosa. *Radiculae* fibrosae multae caespitosae. *Caules* perpauci, glabri, nigrescentes, floribus inclusis vix 7 cm. alti. *Folia* omnia radicalia, petiolis 10-15 mm. longis; lamina profunde pinnatisecta, 5-10 mm. longa, 2.5-

4.5 mm. lata, segmentis 5-6 jugis ovatis 1.5 mm. longis \times 1 mm. latis, acute serratis sed dentibus saepe recurvis deinde quasi obtusis. *Flores* perpauci, plerumque 2, distincte pedicellati; pedicellis 4-10 mm. longis, bifariam pubescentibus. *Calyx* cylindricus, 7 mm. longus, tubo inferne glanduloso-pubescenti, superne fere glabrescentia, ultra medium fissus, dentibus variis vario modo connectis, 3 vel incomplete 5, posteriore lineari ceteris multo minore, apice vix dilatato, reliquiis apice laminam ovatam lobulatam gerentibus. *Corollae* tubus 22 mm. longus, externe pubescens; galeae pars verticalis vix 4 mm. longa, abrupte in partem antherigeram horizontalem 3.5×2.4 mm. decurva, apice in rostrum 5-5.5 mm. longum bilobatum continuata; labium inferum 9 mm. longum, 14 mm. latum, lobo medio parvo dimidium loborum lateralium vix aequante. *Filamenta* anteriora quam posteriora densius pilosa.

S.E. TIBET: Tsari Sama, Langong, Takpo, 4,115 m.; on open wet grassy hillside; galea upright and curled back; perianth wine-red, with a small white patch at throat; 16th June, 1938, *Ludlow, Sherrieff & Taylor 5578* (holotype in Herb. Brit. Mus.).

***Pedicularis pseudoregeliana* Tsoong, sp. nov.**

Herba perennis, humilis, fere acaulis, collo squamis scariosis nonnullis late ovatis usque lineari-lanceolatis ornato. *Radices* paucae, 2-4, vix incrassatae, fibrosae. *Folia* fere omnia radicalia, longe petiolata, petiolis 10-25 mm. longis breviter et parce pubescentibus; lamina oblonga usque oblongo-linearis, 8-15 mm. longa, 4 mm. lata, pinnatisecta, segmentis 4-9 jugis distantibus argute inciso-serratis ovatis. *Pedicelli* glabri, 5-7 mm. longi, in fructu valde elongati 30 mm. longi. *Calyx* glaber, ad medium fissus, dentibus 2, latioribus quam longioribus, valde inciso-lobatis. *Corollae* tubus elongatus 32 mm. longus, 1.4 mm. latus, externe parce pilosus; labium amplum 11 mm. longum, 15 mm. latum, trilobatum, lobo medio obovato truncato reliquiis paulo minore; galeae pars verticalis 5 mm. longa, e basi tenui ad apicem gradatim ampliata, margine antice dentigera, pars antherigera ampla, 5 mm. longa, 3.5 mm. lata, apice in rostrum ad extremum bifidum 5 mm. longum angustata. *Filamenta* in tertia parte superiore tubi inserta, anterioribus densius posterioribus laxius pilosis. *Capsulae* vetustiores triangulari-lanceolatae acutae 12 mm. longae, 5 mm. latae.

NEPAL: Dhudkund, 6 miles east of Timure, 4,725 m.; damp banks near stream; flowers pink-purple; 5th July, 1949, *O. Polunin 831* (holotype in Herb. Brit. Mus.).

In general appearance this new species recalls *P. regeliana* Prain, but structurally it is very different. Its true relationship is with *P. tapaoensis*. It agrees with that species in the general shape of the lower lip of the flower, as also of the galea, especially the dentate anterior margin, but differs in the much finer and longer tube and the two-toothed deeply split calyx. The leaves are also narrower and longer.

Here also belongs *Lal Dhwoj 106*, likewise from Nepal, now preserved in the Edinburgh Herbarium.

***Pedicularis tantalorrhynchoides* Tsoong, sp. nov.**

Herba perennis. *Rhizoma* verticale elongatissimum carnosum usque 30 cm. longum. *Caules* caespitosi, ad 17 cm. alti, ei anni praecedentis saepe persistentes, basi

squamigeri. *Folia* radicalia longissime petiolata, petiolis ad 7 cm. longis, glabris, saltem basin versus membranaceo-alatis, leviter dilatatis; lamina 3-3.5 cm. longa, 11-18 mm. lata, oblonga, alte pinnatifida vel pinnatisecta, segmentis circa 8-jugis oblongis usque deltoideo-ovatis, margine dentatis valde recurvis, utrinque laxe pilosis, caulina opposita 1-2 paria brevius petiolata. *Inflorescentia* centripeta, verticillastris distantibus, bracteis foliaceis. *Calyx* antice vix fissus, tubo 6 mm. longo, 5-costato, sparsissime albo-piloso, dentibus 5, postico subulato 1.5 mm. longo, reliquiis stipitatis apice valde dilatatis foliaceis inciso-dentatis vel lobulatis. *Corollae* tubus circa 10 mm. longus glaber; galeae pars verticalis 3 mm. longa, pars antherigera circa 5 mm. longa, apice in rostrum 5 mm. longum sensim attenuata; labium inferum 10 mm. longum, 13 mm. latum, margine ciliatum, ad $2/5$ trilobatum, lobo medio late ovato, usque transverse elliptico, 4 mm. longo, 5-5.5 mm. lato, haud stipitato. *Filamenta* antica mediocriter pilosa. *Capsulae* ovato-oblongae subaequalilaterales apiculatae, 10 mm. longae, 4.5 mm. latae.

S.E. TIBET: Ba La, Pasum Chu, Kongbo, 4,725 m.; grass adjoining avalanche slopes; corolla reddish pink, 27th June, 1947 Ludlow, Sherriff & Elliot 14025 (holotype in Herb. Brit. Mus.). Tsanang La, near Paka, Kongbo, 4,260 m.; 18th July, 1938, Ludlow, Sherriff & Taylor 5874. Lusha Chu, Kongbo, 3,960 m.; 12th June, 1938, Ludlow, Sherriff & Taylor 4790.

A species closely allied to *P. tantalorrhyncha* Franch., this can easily be distinguished by its leaves having longer petioles and less numerous pinnae, by its calyx being scarcely split, by its galea being not crested and lastly by its lip being less deeply divided with the mid-lobe broader than long, not longer than broad and somewhat stipitate as in *P. tantalorrhyncha*. The pedicels in *P. tantalorrhynchoides* are spreading, so that the inflorescence is over 3 cm. across, while in *P. tantalorrhyncha* they are erect or strongly ascending, so that the inflorescence is only 18 mm. across.

Here also belongs *Kingdon-Ward* 5904, from Temo La, formerly identified as *P. cephalantha* Franch.

***Pedicularis sherriffii* Tsoong, sp. nov.**

Herba humilis, ad 9 cm. alta. *Rhizoma* breve crassum, radiculis plurimis caespitosis cylindricis elongatis longioribus ad 18 cm. longis munitum, apice petiolis vetustioribus persistentibus saepe ornatum. *Caules* arcuato-adscentes vel patentes, inferne laxius superne densius pilosi. *Folia* radicalia longe petiolata, petiolis ad 4 cm. longis glabris, basin versus laxe pilosis; lamina oblongo-elliptica usque elliptica, 3 cm. longa, 16 mm. lata, pinnatisecta, segmentis 4-5-jugis ovato-ellipticis basi cuneatis margine inciso-lobulatis lobulis iterum paucidentatis. *Folia* caulina brevius petiolata, opposita; lamina illi foliorum radicalium simillima sed segmentis paucioribus. *Flores* in axillis foliorum superiorum in fasciculis disjunctis. *Calyx* 9-11 mm. longus, laxe sed longe pilosus, tubo vix longiore quam dentibus (quorum postico paulo minore est) omnibus stipitatis apice nonnunquam valde inflatis foliaceo-multilobatis. *Corollae* tubus 16 mm. longus, 3 mm. latus, externe levissime pubescens, sursum infra labium dilatatus, incurvus; galea latitudine tubi, 9 mm. longa, fere erecta, apice dentibus duobus brevibus sed satis distinctis ornata; labium galea paulo longius, 11 mm.

longum et fere 11 mm. latum, lobis omnibus oblongis, medio lateralibus paulo minore. *Filamenta* antica leviter pilosa postica glabra.

S.E. TIBET : Chubumbu La (South side), Langong, Takpo, 3,960–4,260 m. ; on open earthy slopes, south face ; growing in large clumps ; galea slightly arcuate, deep wine-red at tip, remainder of perianth wine-red, almost white in the centre : 7th June, 1938, *Ludlow, Sherrieff & Taylor 3991* (holotype in Herb. Mus. Brit.).

Among species already known this comes nearest *P. collata* Prain. It has, however, a very different appearance because of its strongly diffuse habit. The stems are densely pubescent and procumbent and somewhat woody. The corolla differs also in the apically prominently curved tube which in *P. collata* is straight and shorter. Its true ally is, in fact, another species *P. atroviridis*, described immediately below, with which it form a very natural new series.

***Pedicularis atroviridis* Tsoong, sp. nov.**

Herba humilis, vix 7 cm. alta. *Radicalae* elongatae caespitosae lineares vel paulo incrassatae longioribus ad 8 cm. longis, collo squamis scariosis ovatis oblecto. *Caules* caespitosi arcuato-adscendentes pilosi. *Folia* radicalia longe petiolata, petiolis ad 23 mm. longis glabris ; lamina ovata vel ovato-elliptica 12 mm. longa, 8 mm. lata, pinnatisecta segmentis ovatis circ. 4-jugatim pinnatipartitis lobis argute paucidentatis. *Folia* supera et floralia subopposita vel opposita, ovata vel rotundata, brevius petiolata, petiolis ad 6 mm. longis ; lamina ovata tri-vel subquinque-lobata. *Flores* pauci in fasciculis singulis terminalibus vel raro binis paulo distantibus. *Calyx* glaber, tubo 4.5 mm. longo, dentibus 5, postico triangulari cuspidato reliquiis linearibus apice vix incrassatis leviter recurvis 1.5 mm. longis dimidio brevioribus. *Corollae* tubus circa 12 mm. longus, externe pilosus, inferne strictus, superne infra labium leviter incurvus ; galea 6.5 mm. longa, dorso leviter incumbente, fronte abrupte decurba margine infero bidentata ; labium inferum galeam multo excedens, circa 1 cm. longum et latum, margine leviter erosum glabrum, lobis omnibus pilosis. *Filamenta* prope basim tubi inserta, anticis tantum pilosis. *Stylus* leviter vel vix exsertus.

S.E. TIBET : Tum La, Nayü, Kongbo, 3,652 m. ; on open moss covered slopes ; perianth bright purplish-pink ; galea upright, slightly arcuate, pale at throat ; leaves very dark green ; 9th July, 1938, *Ludlow, Sherrieff & Taylor 5801* (holotype in Herb. Brit. Mus.).

Closely allied to *P. sherrieffii* above, *P. atroviridis* differs in the radical leaves being much bigger and longer petiolate, the calyx-teeth more foliaceous, the corolla-tube less hairy and the galea more rounded at the apex.

***Pedicularis elliotii* Tsoong, sp. nov.**

Herba vix 15 cm. alta. *Radices* caespitosi cylindrico-fusiformes plus minusve carnosae. *Caules* e collo profuse emittentes ramosissimi prostrati vel adscendentes glabri. *Folia* radicalia evanida, petiolis linearibus subhyalinis, caulina opposita, inferiora longe petiolata, petiolis 4.5 mm. longis ; lamina 35 mm. longa, 20 mm. lata, ambitu elliptico-ovata, infra medium bipinnatisecta, antice simpliciter et irregulariter pinnatisecta, pinnis petiolulatis (petiolulis ad 2.5 mm. longis), iterum pinnatisectis,

10 mm. longis, 6 mm. latis, segmentis 2-3-jugis stipitatis 2.5 mm. longis, apice dilatatis inciso-dentatis vel pinnatifidis; folia caulina superiora minora, petiolis paulo quam lamina brevioribus, lamina elliptico-oblonga, pinnatisecta. *Flores* omnes axillares, distincte pedicellati, pedicellis ad 8 mm. longis, leviter villosis. *Calyx* 1 cm. longus, sparse sed longe villosus, antice haud fissus, dentibus 5, summo multo minore lineari integerrimo, ceteris longe stipitatis apice dilatatis ovatis incis. *Corollae* tubus tenuis glaber 25 mm. longus; galeae pars verticalis 1-1.5 mm. longa, pars antherigera leviter inflata sub angulo recto incurva, 5 mm. longa, 2.5 mm. lata, apice in rostrum 3.5 mm. longum truncatum paene subite producta. *Filamenta* paulo infra summum tubi inserta, anticis levissime pilosis fere glabris.

S.E. TIBET: Budi Sobe La, Kongbo, 3,652 m.; by side of a river in a damp place; light purple flower with long whitish purple tube; 16th June, 1947, *Ludlow, Sherriff & Elliot 15242* (holotype in Herb. Mus. Brit.).

The nearest affinity of this new species as far as can be judged is with *P. sikkimensis* Bonati. The dense matted growth of this species and the bigger flowers having a much thicker galea ending in an entire beak easily distinguish it from that species. The two form a new series which comes close to another new series typified by *P. atroviridis* Tsoong.

***Pedicularis ludlowii* Tsoong, sp. nov.**

Herba perennis. *Radiculae* caespitosae plurimae fusiformi-cylindricae carnosae. *Caules* 1-4, arcuato-adscendentes vel erecti, 20 cm. alti, longe denseque pilis brunneis patentibus obtecti, striati. *Folia* radicalia ad 35 mm. longe petiolata, petiolis eodemmodo pilosis; lamina ad 7 cm. longa, 25 mm. lata, bipinnatipartita-sectave, rhachide lobulato-alato, segmentis 15-20 paribus, ambitu lanceolato-oblongis, acutis, basi cuneatis vel subdecurrentibus, circa 3-5-jugatim pinnatisectis, ad 12 mm. longis, 7 mm. latis, apicem foliorum versus decrescentibus fere linearibus, utrinque (sed supra densius) setuloso-pilosa; folia caulina opposita, vulgo 2 paria, pari inferiori longius petiolata, petiolis ad 25 mm. longis leviter dilatatis, pari superiori 7-10 mm. longe petiolata, petiolis magis dilatatis, omnibus margine ciliatis; lamina eodemmodo lobata sed multo minora. *Flores* in spicas basi subdisjunctas apice densas ad 8 cm. longas dispositi, bracteis foliaceis basi dilatatis. *Calyx* breve pedicellatus, antice ad 1/4 vel 1/3 fissus, externe longe pilosus, tubo circa 9 mm. longo, dentibus 5, postico valde reducto, vix 1.5 mm. longo subulato, reliquiis bene evolutis foliaceis elliptico-oblongis inciso-lobulatis lobulis iterum dentatis, margine omnibus longe ciliatis. *Corollae* tubus vix calycem excedens, circa 11 mm. longus, externe glaber interne ad faucem leviter pilosulus, apice leviter ampliatus; galeae pars verticalis 5 mm. longa, 2.5 mm. lata, pars antherigera sub angulo recto incurva, circa 5 mm. longa \times 3 mm. lata sensim in rostrum rectum validum 6 mm. longum apice leviter bifidum attenuata; labium inferum amplissimum circa 18 mm. longum, 20 mm. latum, trilobatum, margine repandum vel erosum, lobo medio lateralibus dimidio aequante, latiore quam longiore, apice emarginato. *Filamenta* super partem inferiorem tubi affixa, anticis ad insertionem et parte superiore pilosis, posticis glabris.

BHUTAN: Dungshinggang (Black Mountain), 4,572 m.; on open grassy meadows among dwarf rhododendrons; perianth rich wine-red, spur darker; leaves dull green

tipped purplish ; 27th June, 1937, *Ludlow & Sherriff* 3323 (holotype in Herb. Brit. Mus.). Kangla Karchu La, Mo Chu drainage, 4,572 m. ; 20th June, 1949, *Ludlow, Sherriff & Hicks* 16591.

This species has no evident close relative. Its big flower, with long galea and ample lower lip, suggest some relationship to the species of series *Macranthae*, but the bipinnatisect, profusely produced radical leaves recall, on the other hand, the habit of series *Comosae* and *Rostratae*. Some resemblance is also shown to the species of series *Oliganthae*, *Infirmas*, etc., but all these are alternate-leaved. No apparent affinity is found in the opposite-leaved realm. It should be made to represent a new series to be placed tentatively near yet another new series typified by *P. sikkimensis*.

***Pedicularis reptans* Tsoong, sp. nov.**

Herba annua (?), habitu *Potentilla reptantam* aemulans. *Radix* singularis, leviter incrassata, ad 3 cm. longa, fibrosa. *Caules* multi, tenues, vix $1/3$ mm. diam., elongati, ultra 20 cm. longi vel saepe breviores, dense hirtelli, nodis ad 2.5 cm. distantibus, inferioribus vulgo radículas fibrosas emittentibus. *Folia* omnia caulina, opposita, distincte petiolata, petiolis 1.5 usque 10 mm. longis, eodem modo ac caule hirtellis ; lamina rotunda, elliptica usque elliptico-oblonga, basi truncata vel leviter cordata, apice obtusissima, ad 8 mm. longa fere ac lata, utrinque ad $1/2-2/3$ pinnatifida, lobis 3 vel 4-jugis, irregulariter duplicato-serratis, utrinque subtiliter reticulata. *Flores* in axillis partis mediae caulium siti, singuli ad 5 mm. longe pedicellati. *Calyx* cylindricus, densissime pilosus, ad 5.5 mm. longus, 2 mm. latus, antice vix fissus, dentibus 5, omnibus stipitatis, postico vulgo minore apiceque minus dilatato et serrato, reliquiis majoribus late ovatis profunde inciso-pauci-serratis dentibus acutissimis. *Corollae* tubus elongatus, 16 mm. longus ; galeae pars antherigera horizontalis 5 mm. longa, 2 mm. lata, antice in rostrum breve porrectum apice truncatum leviter bifidum abiens ; labium inferum 6.5 mm. longum, 7.5 mm. latum, trilobum lobo medio lateralibus dimidio minore, margine omnino glabris. *Filamenta* in triente superiore tubi affixa, omnia glabra. *Stylus* leviter exsertus.

S.E. TIBET : Trulung, Po Tsangpo, Pome, 2,134 m. ; in damp ground ; flowers pink with a white spur, 20th May, 1947, *Ludlow, Sherriff & Elliot* 13053 (holotype in Herb. Brit. Mus.).

P. reptans is the first species known in the genus to be completely diffuse and to root freely at the lower nodes. In general appearance it is most similar to *P. cymbalaria* Bonati, a species of the series *Lyratae*, both in habit and the shape of the leaves, but its real affinity is hard to name ; it may be far apart from that species. Its peculiar habit makes it necessary to create a new series for its accommodation. It is tentatively kept near series *Lyratae*.

***Pedicularis poluninii* Tsoong, sp. nov. (Ser. *Debiles*)**

Herba annua. *Radix* cylindrica, fibrosa. *Caulis* simplex, erectus, ad 25 cm. altus, undique pilosus. *Folia* radicalia pauca, elliptica usque oblonga, circa 1 cm. longa, 5 mm. lata, pinnatisecta, segmentis circa 3-jugis, ovatis, vix 1.5 mm. longis, distantibus, margine argute serratis revolutis dentibus albo-cartilagineis utrinque pubescenti-

bus, petiolis fere lamina aequilongis; folia caulina 4-verticillata, paulo minora breviusque petiolata. *Inflorescentia* e verticillastris 4-7 longe distantibus composita. *Calyx* cylindricus, pilosus, 10-costatus, 5 mm. longus, dentibus ovato-oblongis inaequalibus margine dentatis reflexis. *Corollae* tubus calyce minus quam duplo longior, glaber; galeae pars erecta 3.5 mm. longa, pars antherigera vix 2.5 mm. longa, apice in rostrum circa 3 mm. longum porrecte attenuata; labium inferum 7 mm. longum, 9 mm. latum, trilobum, lobo medio transverse elliptico, lateralibus paulo minore. *Filamenta* omnia glabra.

NEPAL: Chilime Kharka, 4,420 m.; flowers magenta; July, 1949, *O. Polunin 1149* (holotype in Herb. Brit. Mus.).

This species resembles *P. instar* Prain in habit, especially in the long interrupted inflorescence, but differs in the shape of the leaves, in the slightly shorter beak and in the lower lip, the mid-lobe of which is long stipitate and not so deeply divided from the lateral lobes. The shape of the leaves suggests rather those of *P. confertiflora* Prain and its allies.

***Pedicularis canescens* Tsoong, sp. nov. (Ser. *Debiles*)**

Herba nana, albo-canescens. *Caulis* singulus (?), 6-10 cm. altus, erecto-adscendens, parte vetustiore glabrescens. *Folia* supra laxius subtus dense albo-lanulosa, radicalia evanida, caulina opposita, 2-3 paria, inferiora ad 7 mm. longe petiolata; lamina oblonga, circa 4-natim pinnatipartita, 6 mm. longa, 3.5 mm. lata, segmentis ovatis margine argute albo-cartilagineo-dentatis membranaceis. *Flores* aut conferti subcapitati aut in verticillastris duobus disjuncti, bracteis ambitu plerumque rhombeo-ovatis utrinque angustatis, irregulariter palmatilobatis, sessilibus, lobis magis inaequalibus herbaceis atroviridibus margine albo-cartilagineo-serratis, lamina parva, membranacea. *Calyx* 7 mm. longus, 10-costatus, membranaceus, 5-dentatus, dentibus inaequalibus quorum 1 multo minore reliquiis 1.5-2 mm. longis ovatis margine reflexis cartilagineo-serratis. *Corollae* tubus 7 mm. longus glaber; galeae pars verticalis 3 mm. longa, pars antherigera 3.5 mm. longa, 1.5 mm. lata, apice subabrupte in rostrum leviter nutans 6 mm. longum producta; labium inferum 7 mm. longum, 8 mm. latum, aequaliter 3-lobatum, lobis omnibus late obovato-ellipticis, lateralibus ex nervo medio excurrente leviter acutis. *Filamenta* omnia glabra.

KASHMIR: Naini Tal to Srinagar, Thato Pass, 4,260-4,572 m.; Miss G. E. Benham (holotype in Herb. Brit. Mus.).

A species somewhat related to *P. confertiflora* Prain and its allies, but easily distinguished by its harshly canescent pilosity and the strongly cartilaginous tothing of its leaves, bracts and calyx. The bracts, which are irregularly palmatilobate with a membranaceous blade surrounded anteriorly by rather fleshy dark-green lobes, are quite unique in appearance. The apiculate lateral lobes of the lower lip provide another peculiar feature.

***Pedicularis sphaerantha* Tsoong, sp. nov. (Ser. *Debiles*?)**

Herba humilis vel subelata, dense villosa. *Rhizoma* breve, radicibus fibrosis. *Caules* singuli vel plurimi, centrales erecti, laterales saepe arcuato-adscendentes.

Folia radicalia et caulina inferiora longius petiolata, petiolis ad 1 cm. longis, laxe pilosis; lamina elliptica usque oblonga, 1-2 cm. longa, 5-8 mm. lata, pinnatisecta, segmentis 5-7 jugis oblongis iterum pinnatipartitis dentatisve. *Folia* caulina 3-4-natum verticillata, verticillastris 2-3 distantibus, petiolis brevibus, plus minus dilatatis; lamina ut in folia radicalia. *Inflorescentia* condensata, globosa, bracteis basi valde dilatatis hyalinis antice palmatim multilobatis lobis cristatis. *Calyx* pilosus, 5-dentatus, dente postico triangulari-integro, reliquiis stipitatis apice 3-dentato-cristatis. *Corollae* galea erecta, parte verticali 3 mm. longa, margine antice auriculis duobus triangularibus acutis vel haud raro rotundiusculis utrinque aucta, parte antherigera horizontali, parvula, vix 4 mm. longa, 2 mm. lata, apice sensim in rostrum elongatum tenue subnutans 8 mm. longum attenuata; labium inferum trilobatum, ambitu triangulari-ovato, margine ciliato, lobo medio parvulo plus duplo minore apice valde saccato cucullato. *Filamenta* prope medium tubi inserta, anticis sparse pilosis.

S.E. TIBET: Tumbatse, Rong Chu, Kongbo, 3,536 m.; in boggy grassland; corolla deep magenta pink; galea of darker shade, falcate and slightly twisted; 2nd July, 1938, *Ludlow, Sherriff & Taylor 5091* (holotype in Herb. Brit. Mus.). Nyima La, Kongbo, 3,810 m.; 4th July, 1938, *Ludlow, Sherriff & Taylor 5113*.

This species is manifestly allied to *P. confertiflora* Prain, but can be recognized at a glance by the auriculate anterior margin of its galea which is somewhat crested at the base of the beak. It further differs in the ciliate margin of the lower lip, the more strongly cucullate tip of the mid-lobe which forms a small but very distinct sac, and the hairy anterior filaments. The shape of the galea looks strangely similar to that of *P. oxycarpa* Franch., a species otherwise not related.

***Pedicularis inconspicua* Tsoong, sp. nov. (Ser. *Debiles*)**

Herba perennis, caespitosa, siccitate nigrescens, bifariam pubescens. *Radices* caespitosae, filiformes, ad 7 cm. longae. *Caules* adscendentes, circa 15 cm. alti. *Folia* radicalia longe petiolata, petiolis filiformibus, patente pubescentibus, 1.5-5 cm. longis; lamina elliptica usque oblonga, pinnatisecta, ad 3.5 cm. longa, 13 mm. lata, supra glabra, subtus dense albo-pilosa, segmentis circa 5-8-jugis, oblongis, pinnatifidis, lobulis dentatis, margine revolutis. *Folia* caulina breviter petiolata, opposita, lamina minora. *Flores* oppositi, inferiores plus minus interrupti. *Calyx* parvus, tubo vix 3.5 mm. longo, 10-costato, dentibus 5, summo reliquiis linearibus apice leviter dilatatis tubo aequilongis dimidio minore, subulato. *Corollae* tubus paulo calycem superans, glaber; labium inferum amplum, fere rotundatum, 12 mm. longum, 13 mm. latum, ad 1/3 trilobatum, lobis lateralibus medio rotundato 4 mm. longo ac lato plus duplo majoribus; galeae pars verticalis 4 mm. longa, pars antherigera incurva 3-4.5 mm. longa, in rostrum 5-6 mm. longum tenuiter attenuata. *Filamenta* antica leviter pubescentia.

BHUTAN: Kantanang, Tsampa, 3,960 m.; beside stream on steep slope; perianth deep wine-red; 5th June, 1949, *Ludlow, Sherriff & Hicks 19060* (holotype in Herb. Brit. Mus.).

A rather inconspicuous species, this seems to be most closely related to *P. tenuicaulis*

Prain and its ally *P. chumbica* Prain. Both these species were formerly kept in the series *Flexuosae*. In my study of the genus I found *P. flexuosa* Hook. f. to be the species most likely to have evolved directly from *P. fragilis* Hook. f., being almost identical in general habit and the shape of leaves with the latter, while the two species mentioned first are more akin to the species of series *Debiles*. These species are therefore removed with good reason from series *Flexuosae* to series *Debiles*, to be kept near *P. confertiflora* Prain. The present species in turn would justifiably be placed with *P. tenuicaulis* Hook. f., from which it differs in the nigrescent habit, the white pilosity on the under-surface of the leaves, etc.

***Pedicularis xylopoda* Tsoong, sp. nov.**

Herba nana, 4–7 cm. alta. *Radix* cylindrica, fibroso-ramosa. *Caulis* satis lignosus, ad basim valde ramosus, bifariam pubescens, ramis lateralibus saepe procumbentibus, centrali adscendenti. *Folia* opposita, radicalia mox evanida, ut caulina inferiora longe petiolata, petiolis ad 13 mm. longis; lamina ad 18 mm. longa, 7 mm. lata, oblongo-lanceolata, pinnatifida vel pinnatisecta, segmentis circa 5–7, late ovatis, grosse inciso-dentatis vel lobulatis, lobulis iterum vulgo tridentatis, supra laxe subtus densius pubescentia furfuracea. *Bractae* filiformes, basi valde dilatatae, ambitu ellipticae. *Flores* pedicellati, pedicellis ad 5 mm. longis. *Calycis* tubus 4.5 mm. longus, antice haud fissus, albo-pilosus, dentibus 5, quorum postico subulato quam reliquis basi stipitatis apice dilatatis latioribus quam longioribus trilobatis lobis iterum dentatis dimidio minore. *Corollae* tubus 22 mm. longus, externe pilosus; galeae pars verticalis 4 mm. longa, margine antice ad medium breviter bidentata, pars antherigera 5–6 mm. longa, apice sensim in rostrum 4–5 mm. longum attenuata; labium inferum basi valde cordatum, 10 mm. longum, circa 12 mm. latum, ad medium trilobatum, lobo medio quam lateralibus minore apice cucullata. *Filamenta* omnia glabra. *Capsulae* ellipticae paulo assymetricae, 12 mm. longae, 5 mm. latae, apiculatae.

BHUTAN: Pangotang, Tsampa, 4,260–4,572 m.; on open grassy slope in little patches; perianth and tube deep velvety wine-red or deep crimson; 13th September, 1949, Ludlow, Sherriff & Hicks 19741 (holotype in Herb. Brit. Mus.).

This is a species nearly related to *P. urceolata*, a new species collected near Tatsienlu by Harry Smith (no. 10699), but it differs from that species in its smaller dimensions, more woody stem, much denser indumentum—which is furfuraceous—more slender but shorter corolla-tube and the much darker colour of its flowers.

P. urceolata and the present new species have a close bearing on the series containing the monotypic *P. binaria* Maxim. They are most probably direct descendants of that species, which has hitherto been placed in series *Pseudorostratae* and associated with *P. tatsienensis* Bur. & Franch. and *P. chenocephala* Diels; these in turn were kept in sect. *Dolichophyllum* by Li in his Revision. On account of the strictly opposite (not verticillate) leaves and flowers, the almost woody habit and especially the straight corolla-tube, *P. binaria* Maxim. is very distinct from the two species of series *Pseudorostratae*, and by these characters it is better regarded as the type of a separate new series. Its systematic position is not with *Pseudorostratae*, which has a

perennial and strictly herbaceous habit, 4-verticillate upper leaves and flowers, and a corolla-tube that bends forward at the apex, but is with the series *Debiles*; therefore its accommodation in sect. *Brachyphyllum* is more satisfactory than in sect. *Dolichophyllum*.

***Pedicularis fletcheriana* Tsoong, sp. nov.**

Radix cylindrica, subcarnosa, ramosa, ad 8 cm. longa, apice saepe fibrifera. *Caules* caespitosi, pauci vel plurimi (ad 10), laterales prostrato-adscendentes, medii erecti, glabri. *Folia* omnia petiolata, radicalia pauca, petiolis 2.5 cm. longis; lamina oblonga, 8 cm. longa, 2 cm. lata, circa 7-jugatim pinnatisecta, pinnis distantibus pinnatipartitis oblongo-ovatis, circa 1 cm. longis, 7 mm. latis, iterum argute et irregulariter serratis, dentibus callosis. *Folia* caulina minora et brevius petiolata, petiolis basi dilatatis. *Flores* omnes axillares, inferiores distantes, superiores contigui, bractaeas vix superantes. *Calyx* cylindricus, 23 mm. longus, externe longe pilosus, antice ad 1/4 fissus, dentibus saepe coehaerantibus, 2 vel 4, foliaceis, 5–6 mm. longis, fere ac latis, ovatis, in lobos 2–4-jugos argute serratos profunde pinnatifidis. *Corollae* tubus 2.2 cm. longus, glaber; galeae pars verticalis circa 6 mm. longa, leviter reflexa (non incumbens), pars antherigera fere aequilonga, apice in rostrum breve conicum circa 3 mm. longum profunde bilobum attenuata; labium inferum magnum, galeam multo excedens, circa 16 mm. longum 20 mm. latum, lobo medio quam lateralibus leviter longiore, oblongo, 8 mm. longo, 5.5 mm. lato, apice ut in lateralibus paulo latioribus leviter retuso. *Filamenta* ad medium tubi inserta, anticis leviter pilosis.

BHUTAN: Below Singhi Dzong, 2,438 m.; 21st July, 1949, *Ludlow, Sherriff & Hicks 21312*. Lao (Trashigangse Chu), N.E. Bhutan, 2,743 m.; 5th July, 1949, *Ludlow, Sherriff & Hicks 20480*.

S.E. TIBET: Chayul Chu, Chayul, 3,353 m.; 24th July, 1936, *Ludlow & Sherriff 2427*. Kyimpu, Chayul-Charme road, Charme 3,960 m.; 26th July, 1936, *Ludlow & Sherriff 2444*. Char Chu, Charme, 3,120 m.; 2nd July, 1936, *Ludlow & Sherriff 2269*. Lilung, Tsangpo Valley, Kongbo, 3,048 m.; 1st July, 1938, *Ludlow, Sherriff & Taylor 5712*. Singo Samba, near Molo, Kongbo, 3,505 m.; 15th July, 1936, *Ludlow 1915*. Dzala, Pasum Chu, Kongbo, 3,810 m.; 2nd July, 1947, *Ludlow, Sherriff & Elliot 14058*. Bo La, 4,572 m.; 9th September, 1947, *Ludlow, Sherriff & Elliot 15706*. Lusha Chu, Kongbo, 3,505 m.; on mossy bank of river; lower lip of corolla erect, white with flush of purple on palate, enclosing the galea; galea broadly curved, reddish purple at base, suffused pale purple; 15th June, 1938; *Ludlow, Sherriff & Taylor 4828* (holotype in Herb. Brit. Mus.). Deyang, Kongbo, 2,896 m.; 28th July, 1938, *Ludlow, Sherriff & Taylor 5455*.

This new species is allied to *P. aschistorhyncha* Marquand & Shaw, *P. klotzschii* Hurusawa (*P. macrantha* Klotzsch, non Sprengel) and *P. sculleyana* Prain. From the first, with which it agrees in the shape of the calyx with two large foliaceous teeth and cylindric tube, it can be readily recognized by its deeply cleft beak. From the second, which is less closely related, it differs in the foliaceous calyx-teeth, the bigger lower lip and the shorter but more deeply cleft beak. From the third, its closest ally, it differs in the usually shorter and broader leaves, in the much shorter inflorescence, in the two foliaceous instead of five short calyx-teeth, in the narrower lobes of the

lower lip and especially in the more highly split beak, the cleft of which passes far beyond its own length, to reach as far as the front of the galea.

This new species was first brought to my notice by Dr. H. R. Fletcher, of the Royal Botanic Garden, Edinburgh, who kindly sent me some living material for identification. This came from a plant raised at Keillour Castle, Perthshire (from seeds under the number *Ludlow, Sherriff & Elliot 15824*) by Major and Mrs. Knox Finlay, who, at my request, kindly sent me additional material, including radical leaves. The description is, however, drawn from the abundant herbarium material cited above, for this species is very common in south-eastern Tibet and Bhutan. According to Major Finlay, the plant was for a time established by seed in his garden and freely reproduced itself. It seems that some members of the genus which have less exact environmental requirements may be easily raised from seed and brought into cultivation, a fact both interesting and encouraging, for it makes possible experimental studies hitherto regarded as hopeless because of the semi-parasitic and saprophytic nature of the genus.

***Pedicularis subulatidens* Tsoong, sp. nov. (Ser. *Oxycarpae*)**

Herba humilis, vix 7 cm. alta. *Radiculae* plurimae, filiformes et fusiformes intermixtae, ad 6 cm. longae. *Caulis* singulus, dense glanduloso-pubescent, efoliatus vel rarius unifoliatus, basi squamis lanceolatis paucis obsitus. *Folia* radicalia longe petiolata, petiolis ad 2 cm. longis, laxe pilosis; lamina oblongo-lanceolata, 17 mm. longa, 7 mm. lata, 6-8-jugatim pinnatisecta, segmentis ovato-oblongis usque ovatis circa 3 mm. longis. *Inflorescentia* subcapitata floribus circa 5-8 congestis, inferioribus ad 7 mm. pedicellatis, superioribus sessilibus. *Calyx* antice ad medium fissus, tubo vix 4 mm. longo, apice tridentato dente postico subulato 2 mm. longo reliquiis paulo longioribus apice levissime dilatatis serratisve. *Corollae* tubus 11-14 mm. longus, vix 1 mm. diametro, externe pubescens; galea ad basim partis antherigeræ valde contorta ut in *P. hookeriana* Wall., 6 mm. longe rostrata; labium inferum cordatum, 11 mm. longum, 13 mm. latum, profunde trilobatum lobo medio lateralibus fere dimidio minore. *Filamenta* ad trientem superiorem tubi inserta, omnia glaberrima, loculis apiculatis.

S.E. TIBET: Ata Kang La, Zayul, 3,960-4,260 m.; on alpine turf slopes, wherever there is a more or less continuous carpet of vegetation; flowers crimson-purple; 11th July, 1933, *F. Kingdon-Ward 10573* (holotype in Herb. Brit. Mus.).

This species is near *P. tibetica* Franch. but differs in being of much smaller stature, with much smaller leaves but longer-tubed flowers. There is also a possibility of its being a relative of *P. hookeriana* Wall. of the series *Longiflorae*, but the tube of the flower is far too short and the inflorescence shows no trace of being centrifugal.

PEDICULARIS DENSISPICA Franch. ex Maxim. in *Bull. Acad. Imp. Sci. St.-Petersb.* xxxii: 594, fig. III (1888).

Subsp. ***schneideri*** (Bonati) Tsoong, comb. nov.

P. densispica var. *schneideri* Bonati in *Notes R. Bot. Gard. Edinb.* xiii: 133 (1921).

Subsp. *viridescens* Tsoong, subsp. nov.

A subsp. *schneideri* recedit planta praesertim glabra, corolla majore ad 16 mm. longa, galea siccitate flavo-viridescencia.

S.E. TIBET : Tsogo, Pasum Tso, Kongbo, 3,597 m. ; border of cultivation ; calyx green, corolla pale pink ; 18th June, 1947, *Ludlow, Sherrieff & Elliot 13924* (holotype in Herb. Brit. Mus.).

Pedicularis porriginosa Tsoong, sp. nov.

Herba perennis. *Rhizoma* verticale, nodosum, radiculis fibrosis ad nodos fasciculatis. *Caulis* singulus, simplex vel rarius parce ramosus, ad basim squamis linearibus paucis ornatus, 7–20 cm. altus, 4-fariam sub-adpressa pubescens. *Folia* radicalia saepe evanida, ad 2 cm. petiolata ; lamina perparva obata, 5 mm. longa, 3 mm. lata. *Folia* caulina opposita, 1–3 paria, inferiora longius superiora brevius petiolata, quam radicalia multo majora, utrinque alboburfuracea, 15–35 mm. longa, 7–12 mm. lata, oblongo-lanceolata vel lanceolata, acuta, pinnatipartita, rhachide alata, segmentis 6–12-jugis lineari-oblongis margine inciso-serratis dentibus cartilagineis. *Flores* numerosi, inferiores in axillis foliorum valde distantes, superiores contigui. *Calyx* subcylindricus, externe parce pilosus, tubo 2 mm. longo, dentibus saepe plus minus confluentibus plerumque 4, triangularibus usque triangulari-lanceolatis, apice vix dilatatis, subintegris. *Corollae* tubus 11 mm. longus, glaber, ad 1/3 sursum inflatus ; galea vix 3 mm. longa, erostrata ; labium inferum leviter stipitatum, profunde trifidum, lobis omnibus oblongis, lobo medio quam lateralibus vix minore. *Filamenta* dense pilosa.

BHUTAN : Rinchen Chu, 4,725 m. ; on grass-covered cliff-ledges ; perianth wine-red with dark purple spots and striations ; leaves dull green, with a white woollen substance on both sides ; 13th July, 1937, *Ludlow & Sherrieff 3442* (holotype in Herb. Brit. Mus.). Omta Tso, 4,572 m. ; 11th August, 1949, *Ludlow, Sherrieff & Hicks 17113*.

A species marked by small basal but much larger cauline leaves, the white snowy scurf on both sides of the leaves, the short galea similar to that of *P. spicata* Pall. of the series *Verticillatae*, the large, deeply lobed lower lip, and the tube which is bent forward in the upper mid-portion. In floral characters, this is very near *P. salicifolia* Bonati except for the bent tube ; in the vegetative characters it is, however, very different. It should constitute the type of a new series. Owing to its ambiguous floral structure, its systematic position is very difficult to fix ; it is kept near series *Abrotanifoliae* for the time being.

Pedicularis rhynchotricha Tsoong, sp. nov. (Ser. *Pectinatae*)

Herba elata, inferne glabra, superne 4–5-fariam pubescens. *Radices* subfusiformes, plurimi, carnosi. *Caules* plurimi vel singuli, simplices, atri, ad 60 cm. alti, inferne teretes, superne striati. *Folia* radicalia evanida, caulina inferiora 4-natim, media superioraque 5-natim verticillata, verticillastris circa 7–9 ; petioli glabri, iis foliorum inferiorum ad 15 mm. longis, iis foliorum superiorum brevioribus vel fere nullis ;

lamina supra secus nervum medium pubescentia cetera glabra, reticulata, inferiora minora, 16 mm. tantum longa, media superioraque majora, 7 cm. longa, 3 cm. lata, ambitu lanceolato-oblonga, acuminata pinnatipartita, rhachide alato, segmentis 6–10-jugis linearibus 4–17 mm. longis, 4 mm. latis, iterum serratis. *Inflorescentia* elongata, centripeta, floribus in fasciculos interruptos circa 8–12 dispositis, bracteis linearibus inferioribus argute serratis superioribus fere integris omnibus flores superantibus. *Calyx* cylindricus, 9 mm. longus, 2.5 mm. latus, dentibus 5, quorum 1 summo filiformi paulo minore, reliquiis lanceolatis apicem versus leviter dilatatis vix serratis 3 mm. longis. *Corollae* tubus 9 mm. longus, glaber; labium inferum ellipticum margine ciliatum basi rotundatum nec attenuatum apice rotundatum subtiliter trilobatum, lobo medio paulo minore; galeae pars verticalis 4 mm. longa, margine antice longe ciliata, pars antherigera 4 mm. longa, 2 mm. lata, sensim in rostrum ea longius tenue (1 cm. longum) sigmoideum in parte medio densissime brunneo-villosum apice integrum attenuata. *Filamenta* in triente superiore tubi inserta, ad insertionem longe denseque pilosa, ceterum fere glabra. *Stylus* leviter exsertus.

S.E. TIBET: Pasum Tso, Kongbo, 3,597 m.; on moist ground; calyx green, corolla violet with long violet tube; 21st July, 1947, *Ludlow, Sherriff & Elliot 15501* (holotype in Herb. Brit. Mus.). Je, Pasum Tso, Kongbo, 3,652 m.; 7th July, 1947, *Ludlow, Sherriff & Elliot 14086*. Valley above Tripe, Kongbo, 3,353 m.; 25th July, 1938, *Ludlow, Sherriff & Taylor 5395*. Kulu Phu Chu, near Paka, Kongbo, 3,505 m.; 28th July, 1938, *Ludlow, Sherriff & Taylor 5983*.

As a species of the series *Pectinatae*, this is unique in possessing a long beak which is densely tomentose at the middle portion. Here also belong specimens collected by Kingdon Ward (*No. 6167*)¹ in the Eastern Himalaya: Atsa Pass, on alpine turf slopes, 27th August, 1924. 'Flower crimson, darker in the centre; tube hairy.'

PEDICULARIS PYRAMIDATA Royle in Benth., *Scroph. Ind.*: 52 (1835).

Subsp. **multiflora** (Pennell) Tsoong, comb. nov.

P. multiflora Pennell, *Scroph. West Himal.*: 139, pl. 24, A. (1943).

KASHMIR: Gund, Sind Valley, 1,829–2,134 m.; 15th August, 1940, *Ludlow & Sherriff 7949*.

The difference between *P. pyramidata* Royle and *P. multiflora* Pennell is insufficient for specific distinction and it is convenient to unite the latter with the former as a subspecies.

PEDICULARIS OLIVERIANA Prain in *Journ. As. Soc. Bengal* lviii, 2: 257 (1889).

Subsp. **lasiantha** Tsoong, subsp. nov.

A typo praecipue pilis longis secus lineam dorsalem corollae differt. Habitus saepe validior, valde ramosus; folia 4–6-natim verticillata, lamina ad 7 cm. longa,

(1) *Ward 6167* in Edinburgh Herbarium is a mixed sheet. Two small plants at the right side belong to another species, being apparently a member of the series *Paucifoliae*. It is unfit for identification on account of the poor material, and is designated as *6167a*.

2 cm. lata, 12-15-jugo pinnatisecta; inflorescentia valde interrupta, ad 20 cm. longa; rostrum 8-10 mm. longum.

S.E. TIBET: Gyantse; 1924, *Ludlow* 36. Hills north of Lhasa, 3,960 m.; 10th July, 1942; *Ludlow & Sherrieff* 8811. Sang, Kongbo, 2,896 m.; 25th June, 1938, *Ludlow, Sherrieff & Taylor* 4986 (holotype in Herb. Brit. Mus.). Sanga Choling, Charme 3,353 m.; 1st July, 1936, *Ludlow & Sherrieff* 2268. Molo, Kongbo, 3,200 m.; 24th June, 1938, *Ludlow, Sherrieff & Taylor* 5657. Molo, Lilung Chu Valley, Kongbo, 3,414 m.; 22nd June, 1936, *Ludlow & Sherrieff* 1851.

This subspecies in its extreme form certainly looks very different from typical *P. oliveriana*. The long hairs on the dorsal line of the corolla and the comparatively elongate beak are distinct enough, not to mention the more numerous pinnae of the leaves. Although the hairs on the dorsal suture of the flowers are mentioned neither by Prain nor by other authors, an examination of the type specimen reveals some faint traces of them; in some authenticated specimens the hairs are very prominent. As all these variations are presented in transitional stages, I prefer to describe it merely as a subspecies.

***Pedicularis mucronulata* Tsoong, sp. nov. (Ser. *Rudes*)**

Herba ultra 60 cm. alta, undique albo-pubescent, haud nigrescent. *Caulis* singulus, simplex, crebre foliatus. *Folia* omnia caulina, utrinque leviter pubescentia, ambitu lineari-lanceolata, ad 55 mm. longa, 11 mm. lata, basi cordato-amplexicaulia, apice obtusiuscula, profunde pinnatisecta, segmentis circa 15-jugis, oblongis usque triangulari-ovatis, argute duplicato-serratis, superioribus gradatim in bracteis plus minusve imbricatas basi late ovatas apice acuminatas fere integras transformatas. *Inflorescentia* racemosa, 10-15 cm. longa. *Calyx* pubescens, tenuissimus, crebre reticulatus, vix 12 mm. longus, dentibus 5 late deltoideo-ovatis acutis. *Corolla* lutea, tubo calycem superanti 15 mm. longo; labium inferum basi longe cuneatum, 11-14 mm. longum, 10-12 mm. latum, ad medium trilobum, lobo medio rotundato iis lateralibus ovato-ellipticis fere duplo latiore, omnibus longe ciliatis apice cuspidatis; galeae pars verticalis circa 6 mm. longa, pars antherigera fere horizontaliter decurva, dense villosa, sensim in rostrum late conicum apice fere truncatum attenuata. *Filamenta* omnia glabra. *Stylus* paulo exsertus vel fere inclusus.

BHUTAN: Below Senghi Dzong, 2,438 m.; on open hill slopes amongst small bushes; flower pale yellow; 21st July, 1949, *Ludlow, Sherrieff & Hicks* 21313 (holotype in Herb. Brit. Mus.).

The nearest ally of this new species among species already known is to be found in *P. clarkei* Hook. f. which it resembles in general appearance. However, the three almost equal narrow-lanceolate lobes of the lower lip in *P. clarkei* at once distinguish it from the present species. The real affinity seems to be with *P. imbricata* described immediately below. The distinction lies in the mid-lobe of the lower lip which is rounded and nearly twice as broad as the lateral lobes. In vegetative characters the width of the cauline leaves of this species is only one-third to a quarter of that in the other species.

***Pedicularis imbricata* Tsoong, sp. nov. (Ser. *Rudes*)**

Herba elata pubescens. *Rhizoma* ramosum, incrassatum, ramis subfusiformibus ad 16 mm. diam., collo radicibus fibrosis dense caespitosis cincto. *Caules* 1-2, simplices, erecti, ad 70 cm. alti, fistulosi striati. *Folia* omnia caulina, basi truncato-cordata, subamplexicaulia, apice acuta, ambitu oblongo-lanceolata, 7 cm. longa, 22 mm. lata, ad $\frac{2}{3}$ pinnatifida, segmentis 13-19 jugis, oblongo-lanceolatis usque ovatis, margine inciso-dentatis lobulatisve, utrinque glabra. *Inflorescentia* ad 30 cm. longa, bracteis inferioribus foliaceis, mediis superioribus late obatis caudato-acuminatis arcte imbricatis prominentissimis, flore brevioribus. *Calyx* 15 mm. longus, membranaceus, reticulatus, laxe pilosus, tubo 12 mm. longo, dentibus 5 subaequalibus deltoideis 3-5 mm. longis. *Corollae* tubus 13 mm. longus, glaber; galeae pars verticalis 5 mm. longa, pars antherigera 6 mm. longa, dorso laxe pilosa, secus marginem inferiorem valde involutem dense trichomata, apice in rostrum ei paulo brevior sensim attenuata; labium inferum circa 12 mm. longum, 7 mm. latum, antice ad $\frac{1}{3}$ in lobos 3 divisum, cujus medio elliptico lateralibus lanceolatis acutis fere duplo latiore. *Filamenta* omnia glabra. *Capsulae* obovatae vix apiculatae, 16 mm. longae, 9 mm. latae, valvis ad medium longitudinaliter canaliculatis, seminibus compressis ovato-ellipticis, 3-3.5 mm. longis, 2.5 mm. latis, pallidis, perforate reticulatis.

BHUTAN: Ju La, Bumthang Chu, 4,260 m.; amidst grass in shrubbery; calyx wine-red; corolla white with a wine-red upper lip; 20th July, 1949, Ludlow, Sherrieff & Hicks 16914 (holotype in Herb. Brit. Mus.).

A near relation of *P. clarkei* Hook. f., from which this new species can be easily distinguished by the generally broader leaves with closer-set longer pinnae, the broad-ovate closely imbricate bracts shorter than the flowers and the galea with involute margin along which there is a dense fringe of hairs. In general aspect, it recalls *P. cinerascens* Franch., but that species has long-stipulate lobes on the lower lip, and is also much smaller in size with shallowly lobed leaves.

***Pedicularis platychila* Tsoong, sp. nov. (Ser. *Rudes*)**

Herba ultra 40 cm. alta, inferne laxius, superne densius crispato-pubescens, sicco nigrescens. *Folia* inferiora evanida, caulina oblongo-lanceolata, inferiora superioraque minora, media ad 6 cm. longa, 15 mm. lata, utrinque plus minus crispato-pubescentia, basi cordato-amplexicaulia, apice obtusiuscula, ad medium laminae vel paulo ultra pinnatipartita, segmentis circa 15-jugis, 3-6.5 mm. longis, and 4 mm. latis, margine lobulatis, lobulis iterum argute cartilagineo-serratis. *Inflorescentia* terminalis, bracteis foliaceis; flores inferiores distantes superiores contigui. *Calyx* amplus, ad 15 mm. longus, dense pubescens, antice haud fissus, apice 5-dentatus, dentibus subaequalibus triangularibus integerrimis 3-4 mm. longis fere ac latis ut tubo crebre reticulatis. *Corollae* tubus calyce aequilongus glaber; labium inferum ambitu transverse ellipticum, circa 9 mm. longum, 10-12 mm. latum, basi valde cuneatum substipitatum, subaequaliter trilobatum, lobo medio paulo quam lateralibus majore, omnibus ovatis obtusiusculis margine ciliatis; galeae pars verticalis circa 5 mm. longa, pars antherigera adscendentia, externe ut margine antice longe pilosa, apice in rostrum

inconspicuum plus minus erosum sensim attenuata. *Filamenta* omnia glabra. *Stylus* longe exsertus.

ASSAM: Ze La, 4,260 m.; scattered on the steep rocky alpine slopes amongst dwarf rhododendrons; flowers pale yellow, calyx very hairy, almost woolly; a tall, erect, single-stemmed species; 19th August, 1938, *F. Kingdon-Ward 14119* (holotype in Herb. Brit. Mus.).

A species nearest *P. clarkei* Hook.f., but distinct in possessing an ascending instead of an incurved galea, which is somewhat erose at the apex, and a lower lip broader than long with wide lobes, this resembling in general that of *P. rudis* Maxim. which has, however, a very differently shaped galea.

***Pedicularis angustiloba* Tsoong, sp. nov. (Ser. *Craspedotrichae*)**

Herba elata, ad 70 cm. alta, praeter inflorescentiam satis pubescentem fere glabra, nigrescentia. *Rhizoma* incrassatum collo radicibus fibrosis puberibus cincto. *Caulis* simplex, erectus, fistulosus, dense foliatus. *Folia* radicalia mox evanida, caulina lanceolato-lineariter, basi amplexicaulia, apice acuta, margine subtiliter pinnatifida, 7 cm. longa, 7 cm. lata, segmentis 27-40-jugis, iterum dupliciter serratis, supra nitida, subtus opaca. *Inflorescentia* 10-25 cm. longa, bracteis foliaceis, flores superantibus. *Calycis* tubus 6 mm. longus, externe albo-pilosus, mediocriter reticulatus, dentibus 5, subaequalibus, triangulari-lanceolatis, 4 mm. longis, subintegris. *Corollae* tubus calyce vix aequans, circa 9 mm. longus, externe glaber; galea arcuata, ad medium inflata, margine antice laxe trichomata, apice rostrata, rostro 1.5 mm. longo, incurvo; labium 14 mm. longum, 8-9 mm. latum, basi valde cuneatum, antice sensim dilatatum, fere ad medium in lobos 3 ovato-oblongus apicem versus erosos acutos fissum, margine plus minusve ciliatum. *Filamenta* ad medium tubi inserta, anticis densius posticis laxius pilosis.

S.E. TIBET: Nambu La, 3,810 m.; 10th July, 1947, *Ludlow, Sherriff & Elliot 15364*. Tamnyen La, Kongbo, 3,353 m.; on loose moraine scree; up to 2 ft.; corolla greenish yellow, galea spotted dark purple and hairy at the margin on the median swollen part; leaves deep purple below; 22nd June, 1938, *Ludlow, Sherriff & Taylor 4938* (holotype in Herb. Brit. Mus.). Deyang La, Kongbo, 4,115 m.; 11th August, 1947, *Ludlow, Sherriff & Elliot 14321*.

This species can be easily distinguished from all the known species of the series *Craspedotrichae* by its strongly cuneate lower lip, divided into three ovate-oblong lobes, and the extremely short corolla-tube, the like of which is only found in *P. steiningeri* Bonati, but that species has a very differently shaped lower lip. In fact, among its allies with narrow, linear, shallowly-toothed leaves, such as *P. ingens* Maxim., *P. pseudoingens* Bonati, *P. steiningeri* Bonati, *P. pseudosteiningeri* Bonati, *P. tongolensis* Franch., etc., this is the only species having the lower lip narrowly trilobed, in which character it approaches *P. clarkei* Hook. f. whose general habit, however, places it in the series *Rudes*.

***Pedicularis kongboensis* Tsoong, sp. nov.**

Herba elata, simplex vel ramosa, undique pubescens. *Rhizoma* crassum, ad 1 cm. diametro, apice radicibus fibrosis cinctum. *Caules* nigrescentes, validi, 30 usque 110

cm. alti. *Folia* linearia vel lineari-lanceolata, 3–12 cm. longa, 2.5–13 mm. lata, pinatifida, lobis triangulari-ovatis usque ovatis circa 30 paribus, margine antice argute duplicato-serratis, dentibus cartilagineis, initio laxe pubescentia mox glabrescentia. *Inflorescentia* spicata, continua vel ad basim interrupta, 10 usque 50 cm. longa, pubescentia. *Calyx* pubescens, tubo 7–8 mm. longo, haud fissus, dentibus 5, subaequalibus triangularibus acuminatis, ut tubo membranaceis prominente reticulatis, 3–5 mm. longis, margine denticulatis vel fere integris. *Corollae* tubus calyce subaequalis vel paulo longior, circa 11–15 mm. longus, glaber; galea angustata, parte verticali incumbente vix 3 mm. longa, margine antice trichomatibus longis subdense ciliata, apice in rostrum continuum valde elevatum apice acutum 7–8 mm. longum producta; labium inferum quam galea manifeste brevior, 10–13 mm. longum, 8 mm. latum, basi lobos magis attenuatos subaequales margine laxe sed longe ciliatos divisum. *Filamenta* supra dimidium tubi affixa, antice dense pilosis. *Stylus* apice plus minus circinatus, exsertus.

S.E. TIBET: Kulu Phu Chu, near Paka, Kongbo, 3,960 m.; on open very steep hillside; $1\frac{1}{2}$ – $3\frac{1}{2}$ ft. high; galea shiny dark wine-red, remainder of perianth very pale yellow; calyx dark wine-red with white hairs; leaves green to dull crimson, 27th July, 1938; *Ludlow, Sherriff & Taylor 5956* (holotype in Herb. Brit. Mus.). Penam Chu, near Je, Pasum Tso, Kongbo, 3,960 m.; 11th July, 1947, *Ludlow, Sherriff & Elliot 14122*.

This constitutes an unusually interesting discovery within the group *Sceptrum*. With its membranaceous reticulate calyx having sub-entire elongate-triangular teeth, its short corolla-tube and its peculiar lower lip deeply divided into lanceolate lobes, it almost certainly has evolved directly from *P. angustiloba* of approximately the same region. The galea is almost on a par with those of *P. excelsa* Hook. f. and *P. viali* Franch. Although the floral characters show relationship to each other, the vegetative features of the two last-named species are closer to series *Rudes* with highly lobed broad leaves, while that of the present species is clearly with series *Craspedotrichae* in having linear, shallowly lobulate leaves. This, in connection with its variety and the next new species, *P. retingensis*, has to be kept in a separate new series.

Var. obtusata Tsoong, var. nov.

A typo recedit calycis tubo breviter laxiusque reticulato, corollae labii inferioris lobis latioribus obtusiusculis.

S.E. TIBET: Dzeng, Gyamda Chu, Kongbo, 2,987 m.; on banks in Ilex forest; corolla purplish red on upper lip, yellow on under lip; style purplish red, stigma green; bracts green 13th August, 1938, *Ludlow, Sherriff & Taylor 6829* (holotype in Herb. Brit. Mus.).

Pedicularis retingensis Tsoong, sp. nov.

Herba elata, perennis. *Rhizoma* crassum, ad 1 cm. diam., apice radices fibrosa emittens. *Caules* nigrescentes, validi, haud ramosi, hirsuti, 30 usque 80 cm. alti.

Folia linearia vel lineari-lanceolata, basi truncata cordatave amplexicaulia, apice acuta vel acuminata, 5–8 cm. longa, 5–8 mm. lata, pinnatifida, lobis triangulari-ovatis vel ovatis circa 30 paribus margine antice argute serratis, utrinque fere glabra. *Inflorescentia* spicata, continua, 10 usque 30 cm. longa, bracteis foliaceis flores superantibus. *Calyx* glaber vel ad dentes laxissime longe pilosus, 8–10 mm. longus, haud fissus, tubo laxissime vel vix reticulato, dentibus 5, plus minus inaequalibus triangularibus vel triangulari-lanceolatis integris. *Corollae* tubus vix e calyce exsertus, 9 mm. longus, glaber; galea angusta, parte basali incumbente vix 3 mm. longa, margine antice trichomatibus longis subdense ciliata, apice in rostrum continuum leviter elevatum apice acutum producta; labium inferum quam galea manifeste brevior, 10 mm. longum, 8 mm. latum, basi valde cuneatum substipitatum, antice $2/3$ in lobos 3 ovato-lanceolatos subaequales margine laxo ciliatos diviso. *Filamenta* prope basim tubi affixa, anticis plus minus pilosis. *Stylus* apice plus minus circinatus, infra apicem rostri exsertus.

S.E. TIBET: Reting, 60 miles north of Lhasa, 4,260 m.; on dry stony hill-sides; flowers cream with deep purple centre; 24th July, 1944, *Ludlow & Sherriff 11060* (holotype in Herb. Brit. Mus.). Reting, 60 miles north of Lhasa, 4,572 m.; 20th July, 1942, *Ludlow & Sherriff 8835*.

This is closely allied to *P. kongboensis*, but differs chiefly in the much smaller, dark-coloured, opaque not membranaceous calyx with scarcely any reticulation and in the shorter and less highly raised beak. The anterior filaments are also less hairy.

***Pedicularis petelotii* Tsoong, sp. nov. (Ser. *Aloenses*)**

Herba elata, ramosissima. *Radix* fibrosa. *Caules* validiusculi, basi satis lignosi, cylindrici, brunneo-tomentelli. *Folia* opposita, omnia caulina, longe petiolata, petiolis ad 3 cm. longis, sparse pilosis; lamina 3 cm. longa, fere ac lata, pinnatisecta, segmentis 2–5-jugis, elliptico-oblongis usque ellipticis, 15 mm. longis, 8 mm. latis, vel in foliis inferioribus bipinnatisecta, segmentis secundariis 3–5-jugis, lineari-oblongis, 4 mm. longis, iterum pinnatifidis vel profunde duplicato-serratis dentibus longe setaceis saepe incurvis. *Flores* in axillis foliorum superiorum solitarii, 3 mm. longe pedicellati. *Calyx* 5.5 mm. longus, antice manifeste fissus, dentibus 5 deltoideis perparvis. *Corollae* tubus 17 mm. longus, cylindricus, glaber; galea leviter falcata, apice edentata, 7–8 mm. longa, circa 2.5 mm. lata; labium inferum 7 mm. longum, erectum vel vix patens, ad $2/5$ in lobos 3 longe ciliatos divisum, lobo medio quam lateralibus ovato-acutis duplo latiore, ambitu ovato obtusissimo, plicis 2 satis elevatis praedito. *Filamenta* antica brunneopilosa, cetera glabra. *Stylus* breviter exsertus. *Capsulae* triangulari-lanceolatae, acuminatae, 10 mm. longae, 2.5 mm. latae.

CHINA: Province unknown, "Massives de Fan Tsi Pan, Route du col de Li Qui Ho, 1,800 m.; July, 1927, *A. Petelot 5111* (holotype in Herb. Brit. Mus.).

I am unable to trace the locality to which the above citation refers. This species is a very characteristic one and is easily distinguishable from the other species of the series *Aloenses*. The long setaceous-toothed pinnae of the leaves and the woody tomentellous stem enable it to be recognized even in a sterile condition. In floral

characters it is remarkable for its split calyx, its very long corolla-tube and its dark-hairy anterior filaments.

PEDICULARIS PLICATA Maxim. in *Bull. Acad. Imp. Sci. St.-Pétersb.* xxxii : 598, fig. 120 (1888).

Var. *apiculata* Tsoong, var. nov.

P. cheilanthifolia sensu Marquand & Shaw in *Journ. Linn. Soc. London, Bot.* xlviii : 211 (1929) ; non Schrenk.

A typo recedit galea manifeste cristata, infra apicem distincte apiculata.

S.E. TIBET : Drukla Gompa, near Shoga Dzong, Kongbo, 3,505 m. ; 19th August, 1938, *Ludlow, Sherriff & Taylor* 6855. Ba La, Pasum Chu, Kongbo 4,115 m. ; gravelly river bed ; calyx pale green, corolla white spotted purple at tip ; 1st July, 1947, *Ludlow, Sherriff & Elliot* 14038 (holotype in Herb. Brit. Mus.). Nambu La, Kongbo, 4,260 m. ; 12th July, 1947, *Ludlow, Sherriff & Elliot* 15393 A.

Here also belongs *Kingdon Ward* 6116, likewise from Drukla Gompa, referred to *P. cheilanthifolia* Schrenk by Marquand and Shaw, and his number 12229 from Upper Yigrong Valley.

This variety differs from the type in having a more prominently crested and apiculate galea ; in these characters it approaches closely *P. globifera* Hook. f. The colour of flowers evidently varies from whitish to sulphur yellow as indicated by the field notes.

Pedicularis siamensis Tsoong, sp. nov. (Ser. *Rigidae*)

Herba elata, pubescens, radicibus caespitosis fibrosis. *Caules* lignosi, ad 7 mm. diam., subquadangulari, fistulosi, ramosissimi, ramis ad 25 cm. longis, divaricatis, 4-natim verticillatis. *Folia* omnia caulina, in caule principali 4-natim, in ramis vulgo 3-natim verticillata, profunde (i.e. fere ad costam mediam) pinnatisecta, segmentis 8-13-jugis linearibus grosse duplicato-serratis dentibus cartilagineis, margine revolutis, utrinque sparse setuloso-pubescencia. *Inflorescentia* terminalis racemosa, bracteis foliaceis minoribus. *Flores* 3-natim verticillati vel superiores bini et oppositi. *Calyx* pubescens, 6 mm. longus, antice vix fissus, dentibus 5, triangulari-lanceolatis distincte cartilagineo-serratis circa 1.5 mm. longis. *Corollae* tubus circa 15 mm. longus, sursum sensim ampliatus ; galea leviter arcuata, 8-9 mm. longa, infra apicem argute bidentata ; labium inferum 12 mm. longum, 10 mm. latum, margine eroso-denticulatum, trilobatum, lobo medio elliptico- vel sub-rotundato, acutiusculo, lateralibus elliptico-oblongis plus duplo minore. *Filamenta* omnia glabra. *Capsulae* late ovatae, apiculatae, 10 mm. longae, 7 mm. latae ; semina oblonga, 2.5 mm. longa, 0.1 mm. lata, longitudinaliter striata, brunnea.

SIAM : Doi Chingdao, 6,400 m. ; open rocky ground ; flower purple, white incrustations on edge of leaf ; 6th November, 1922, *A. F. G. Kerr* 6600 (holotype in Herb. Brit. Mus.).

A species nearest to *P. mairei* Bonati from which it differs in the much less finely dissected leaves and the manifestly elongated and serrate calyx-teeth.

***Pedicularis shawii* Tsoong, sp. nov. (Ser. *Verticillatae*)**

P. roylei Maxim. var. *cinerascens* Marquand & Shaw in *Journ. Linn. Soc. London, Bot.* xlviii : 213 (1929).

A *P. roylei* differt praecipue radice magis incrassata carnosae ea *P. rupicolae* Franch. simillima; quoque recedit indumento densiore, squamis basalibus crebrioribus, segmentis foliorum plus minus imbricatis branchiiformibus, etc.

Herba perennis, valde cinereo-pubescent. *Radix* singula, simplex vel ramosa, elongata, pinguis, ad 10 cm. longa, 8 mm. diam.; caulium basis bracteis multis ovato-lanceolatis obiecta. *Folia* radicalia 20 mm. longa, 8 mm. lata, pinnis ovatis oblongisve plus minus imbricatis. Cetera ut in *P. roylei* Maxim.

S.E. TIBET: Sang La, Kongbo, 4,260 m.; 29th June, 1938, *Ludlow, Sherriff & Taylor 5051*. Nyima La, Kongbo, 4,500 m.; on alpine slopes amongst dwarf rhododendrons; flower purple with upper lip darker; 21st June, 1924; *F. Kingdon-Ward 5814* (holotype in Herb. Hort. Kew.).

PEDICULARIS ROYLEI Maxim. in *Bull. Acad. Imp. Sci. St.-Pétersb.* xxvii : 517 (1881).

Var. ***brevigaleata*** Tsoong, var. nov.

A typo speciei differt galea labio infero multo breviora.

BHUTAN: Me La, 4,260 m.; 4th August, 1933, *Ludlow & Sherriff 388*.

S.E. TIBET: Tamnyen La, Tamnyen Chu, Kongbo, 3,505 m.; 22nd June, 1938, *Ludlow, Sherriff & Taylor 4921* (holotype in Herb. Brit. Mus.). Deyang La, Kongbo, 3,960 m.; 3rd June, 1947, *Ludlow, Sherriff & Elliot 15117a*.

Though in all respects well within the range of variation of the species, this has a much shorter galea than the type (var. *roylei*), a sure sign indicating higher attainment in floral development within the series *Verticillatae*. In general habit, it almost approaches *P. likiangensis* Franch., but that species differs in having different calyx-teeth and pilose filaments. Here also belongs *Kingdon-Ward 9936* from the Adung Valley of the Burma-Tibet Border.

PEDICULARIS DIFFUSA Prain in *Journ. As. Soc. Bengal*, lxii, 2 : 7, tab. 1 (1893).

P. diffusa differs from *P. verticillata* L. in the scarcely split calyx with almost equally spaced teeth.

Subsp. ***elatio*** Tsoong, subsp. nov.

Herba elata, ad 40 cm. alta, foliis floribusque multo majoribus quam in typo. *Folia* radicalia 4.5 cm. longa, caulina 4 cm. longa. Calyx 7-10 mm. longus. Corollae 17-20 mm. longa. Cetera ut in typo.

S.E. TIBET: Tamnyen La, Tamnyen Chu, Kongbo, 3,353 m.; on gravelly stream banks; perianth magenta pink galea tipped crimson, arched upwards and arcuate at apex; 22nd June, 1938; *Ludlow, Sherriff & Taylor 4936* (holotype in Herb. Brit. Mus.).

This is a much more robust plant than typical *P. diffusa* Prain, with comparatively bigger leaves and flowers, but structurally it is not sufficiently different from the type to merit specific rank.

PEDICULARIS KANSUENSIS Maxim. in *Bull. Acad. Sci. St.-Petersb.* xxvii : 516 (1881).

Subsp. *KANSUENSIS*

S.E. TIBET : Reting, 4,572 m. ; 11th July, 1944 ; *Ludlow & Sherriff* 9967.

Subsp. *villosa* Tsoong, subsp. nov.

A typo speciei differt tantum planta undique pilis albidis densissime villosa.

S.E. TIBET : Reting, 60 miles N. of Lhasa, 3,960 m. ; edge of water channels ; flowers reddish brown, 24th July, 1942, *Ludlow & Sherriff* 8869 (holotype in Herb. Brit. Mus.).

PEDICULARIS SZETSCHUANICA Maxim. in *Bull. Acad. Imp. Sci. St.-Petersb.* xxxii : 601, f. 125 (1888).

Subsp. *angustifolia* (Bonati) Tsoong, comb. nov.

P. szetschuanica var. *angustifolia* Bonati in *Bull. Herb. Boiss.*, ser 2, vii : 545 (1907).

S.E. TIBET : Besang Landup, Lochen Chu, 3,652 m. ; 28th August, 1947, *Ludlow, Sherriff & Elliot* 15655.

Pedicularis stenotheca Tsoong, sp. nov. (Ser. *Verticillatae*)

Herba perennis. *Radix* verticalis apice fibrosa. *Caules* pauci, circa 15 cm. alti, 4-fariam pilosi. *Folia* radicalia evanida, caulina 4-verticillata, inferiora longius (25 mm.) superiora brevius petiolata ; lamina lanceolata, ad 20 mm. longa, 10 mm. lata, pinnatipartita vel fere pinnatisecta, segmentis 6-9-jugis, ovatis usque lineari-lanceolatis, pinnatifidis, lobulis dentatis, supra fere glabra, subtus furfuracea pilis albidis munita. *Inflorescentia* brevis. *Calyx* 5 mm. longus, antice vix fissus, vix reticulatus, dentibus 5, postico triangulari integro, ceteris duplo majoribus ovatis serratis. *Corollae* tubus intra calycem infractus, 7 mm. longus ; galea circa 3 mm. longa, apice integra ; labium inferum 6 mm. longo, 8 mm. latum, trilobum, lobo medio minore. *Filamenta* antica laxe pilosa. *Capsula* triangulari-lanceolata, acuminata, 15 mm. longa, 3.5 mm. tantum lata.

S.E. TIBET : Nambu La, Tongyuk River, Pome, 3,652 m. ; on grassy banks in conifer forest ; calyx green, corolla lilac ; 3rd June, 1947, *Ludlow, Sherriff & Elliot* 13835 (holotype in Herb. Brit. Mus.).

A species very similar to *P. verticillata* L., *P. diffusa* Prain and *P. brachycrania* Li. The first agrees with our new species in the shape of the capsule, but differs in having a deeply split calyx with laterally congested teeth. The second and the third, which resemble it in the shape of flower, differ, however, in their broad capsules. In the flowering stage it may be a little difficult to distinguish the latter two species from *P. stenotheca*, although the indumentum on the underside of the leaves may afford some help in identification.

PEDICULARIS CHEILANTHIFOLIA Schrenk in *Bull. Phys.-Math. Acad. Sci. St. Pétersb.* 1 : 79 (1842).

Var. *albida* (Pennell) Tsoong, comb. nov.

P. albida Pennell, *Scroph. West. Himal.* 123 (1943).

KASHMIR : Zoji La, 3,960 m. ; 26th August, 1940, *Ludlow & Sherriff* 8021. Hemis Nullah, Leh, Ladak, 4,115 m. ; 4th July, 1941, *Ludlow & Sherriff* 8461.

The difference between *P. albida* Pennell and *P. cheilanthifolia* Schrenk is no more marked than that between *P. semenowii* Regel and *P. pycnantha* Boiss. When segregating *P. albida*, Pennell did not have enough material at hand. After having seen many specimens from Dzungaria, I am content to regard *P. albida* as merely a variety of *P. cheilanthifolia*.

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INDEX

It is not possible here to give a detailed enumeration with localities, heights, etc., of all the collections mentioned at the beginning of this paper which have been studied in its preparation apart from those representing new or nomenclatorially revised taxa. All the species represented are, however, listed below with indications of the regions in which the specimens have been collected. The list will thus serve as a bibliographical and geographical summary of the detailed enumeration deposited in the library of the Department of Botany, British Museum (Natural History).

- P. alaschanica* Maxim. in *Bull. Acad. Imp. Sci. St. Pétersb.* xxiv : 59 (1878).
P. alaschanica var. *tibetica* Maxim. in *Bull. Acad. Sci. Imp. St. Pétersb.* xxxii : 578 (1888). S.E. TIBET.
P. albiflora Prain in *Journ. As. Soc. Bengal*, lviii, 2 : 273 (1889). BHUTAN.
P. angustiloba Tsoong (p. 25). S.E. TIBET.
P. atroviridis Tsoong (p. 13). S.E. TIBET.
P. bella Hook. f. (p. 6).
P. bella subsp. *bella* (p. 6). S.E. TIBET.
P. bella subsp. *holophylla* (Marq. & Shaw) Tsoong (p. 6). S.E. TIBET.
P. bella subsp. *holophylla* var. *crestifrons* Tsoong (p. 6.) S.E. TIBET.
P. bicornuta Klotzsch & Garcke, *Bot. Ergebn. Reise Prinz Waldemar.* : 109, t. 61 (1862). KASHMIR ; PUNJAB.
P. bifida (D. Don) Pennell, *Scroph. W. Himal* : 144 (1943). NEPAL. ; BHUTAN.

- P. canescens* Tsoong (p. 16). KASHMIR.
P. cheilanthifolia Schrenk (p. 31).
P. cheilanthifolia var. *albida* (Pennell) Tsoong (p. 31). KASHMIR.
P. clarkei Hook. f., *Fl. Brit. Ind.* iv : 840 (1885). BHUTAN.
P. collata Prain in *Journ. As. Soc. Bengal* lviii, 2 : 290 (1889). BHUTAN.
P. confertiflora Prain in *Journ. As. Soc. Bengal* lviii, 2 : 258 (1889). NEPAL.
P. corydaloides Hand.-Mazz., *Symb. Sin.* vii : 851, t. 15 f. 4 (1936). S.E. TIBET.
P. cryptantha Marquand & Shaw (p. 4).
P. cryptantha subsp. *cryptantha*. S.E. TIBET.
P. cryptantha subsp. *erecta* Tsoong (p. 4). S.E. TIBET
P. daltonii Prain in *Journ. As. Soc. Bengal* lviii, 2 : 270 (1889). S.E. TIBET.
P. densispica Franch. (p. 20).
P. densispica subsp. *schneideri* (Bonati) Tsoong (p. 20). S.E. TIBET.
P. densispica subsp. *viridescens* Tsoong (p. 21). S.E. TIBET.
P. demudata Hook. f., *Fl. Brit. Ind.* iv : 309 (1885). SIKKIM.
P. diffusa Prain (p. 29).
P. diffusa subsp. *elatior* Tsoong (p. 29). S.E. TIBET.
P. elephantoides Benth., *Scroph. Ind.* : 53 (1835). KASHMIR.
P. elliotii Tsoong (p. 13). S.E. TIBET.
P. elwesii Hook. f., *Fl. Brit. Ind.* iv : 312 (1885). NEPAL ; BHUTAN ; S.E. TIBET.
P. excelsa Hook. f., *Fl. Brit. Ind.* iv : 311 (1885). BHUTAN.
P. filiculiformis Tsoong (p. 5).
P. filiculiformis var. *filiculiformis* (p. 5). S.E. TIBET.
P. filiculiformis var. *dolichorrhyncha* Tsoong (p. 5). BHUTAN.
P. fletcheriana Tsoong (p. 19). BHUTAN ; S.E. TIBET.
P. furfuracea Wall. ex Benth., *Scroph. Ind.* : 52 (1835). NEPAL ; BHUTAN.
P. garnieri Bonati in *Bull. Soc. Bot. France* lv : 243 (1908). S.E. TIBET.
P. gibbera Prain in *Journ. As. Soc. Bengal*, lviii, 2 : 262 (1889). BHUTAN.
P. gracilis Wall. ex Benth., *Scroph. Ind.* : 52 (1835). NEPAL ; BHUTAN ; S.E. TIBET.
P. heydei Prain in *Journ. As. Soc. Bengal* lviii, 2 : 258 (1889). KASHMIR.
P. hicksii Tsoong (p. 10). BHUTAN.
P. hookeriana Wall. ex Benth., *Scroph. Ind.* : 53 (1835). PUNJAB ; BHUTAN.
P. imbricata Tsoong (p. 24). BHUTAN.
P. integrifolia Hook. f., *Fl. Brit. Ind.* iv : 308 (1885). S.E. TIBET.
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